



**BREVINI<sup>®</sup>**

*Motion Systems*

# Installation and Maintenance Manual

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Posiplan (MT-5215-0806)

IMM-0005EN  
May 2021

## **DISCLAIMER**

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## INTRODUCTION:

Dana Incorporated would like to thank you for choosing one of its products and is pleased to include you among its preferred customers. We hope you will be satisfied with your gear unit.

## ORGANISATION OF THIS MANUAL

A table of contents is provided on the first page to help you find subject matter quickly and to facilitate consultation. The individual chapters are also logically structured to help you locate the information you need.

## PURPOSE OF THIS MANUAL

This manual contains all the information you need to install, operate, and maintain gear units in conformity with applicable safety standards and legislation.

A clear understanding of the following terms is essential to understanding this manual:

### **DANGER ZONE:**

an area within or around a machine in which the health or safety of exposed persons is at risk.

### **EXPOSED PERSON:**

any person inside or partly inside a danger zone.

### **OPERATOR:**

the person charged with installing, operating, adjusting, maintaining or cleaning the machine.

### **TRAINED ENGINEER:**

a specialist designated to undertake unscheduled maintenance or repairs that require special knowledge of the machine, its functioning, safety devices and how they work.

## CAUTION

Essential operator safety information

## WARNING

Damage could be caused to machine and/or machine parts.

## NOTICE

Important information on operation being performed

### NOTE:

#### **Useful information.**

For any doubts or if the manual has been damaged or lost, do not hesitate to contact the Dana Incorporated technical service department.

# WARRANTY

## WARRANTY

Dana Incorporated warrants that its products shall be free from defects for a period of 12 months from the date the product is shown to have been placed in operation and in any case for a maximum period of 18 months from the date of shipment. The warranty is null and void in the event of damage caused by improper or unsuitable use, or use other than that for which the product is commissioned.

- Dana Incorporated's warranty is limited to the repair or replacement of the defective product, subject to Dana Incorporated's acceptance of the defect.
- Dana Incorporated shall not be liable for any damages, either material or economic, resulting from or caused by any defects. Dana Incorporated will only be liable for repair or replacement of the product.
- This gear unit is only intended for use in the environments and applications for which it was designed.
- All other uses are deemed improper and are forbidden.
- Modification to or replacement of parts not authorized by Dana Incorporated may lead to accident and therefore releases the manufacturer from any civil or penal liabilities, and furthermore invalidates the warranty.

## GENERAL WARNINGS

Installation personnel should be trained on the following aspects of machine safety:

- Risks of accident.
- Operator safety equipment, PPE (personal protection equipment: goggles, gloves, hard hat, etc.)
- General safety precautions and all specific standards prescribed in international directives and national legislation in the country of installation.
- On delivery, check that the gear unit has not been damaged during transport and that all accessories are intact.
- Before starting any work, operators must be familiar with machine features and must have read this manual in full.

## COPYRIGHT AND COPYING RESTRICTIONS

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## REVISIONS

Any modifications to or replacements of functional parts of the gear unit will lead to the issue of a new revision of this manual.

## TRACKING LIST

NAME	REV.	DATE	DESCRIPTION
Manual Posiplan	00	04/07/2012	Document issued
IMM-0005EN Posiplan (MT-5215-0806)	01	15/10/2018	- Changed layout - Updated "TECHNICAL DATA:(p. 7)"

## MODELS

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## TECHNICAL DATA:

Each individual gear unit is fitted with an identification plate and a manufacturer's declaration (as per Appendix IIB) drawn up in accordance with EC Directive 392 as amended. The identification plate provides essential technical data on the functional and constructive features of the gear unit; hence it must be visible and undamaged at all times.




- 1 - Type or gear unit
- 2 - Date of production: month/year - country of production
- 3 - Description
- 4 - Gear unit output
- 5 - Reduction ratio
- 6 - Gear unit input
- 7 - Info
- 8 - Bar code
- 9 - Serial number

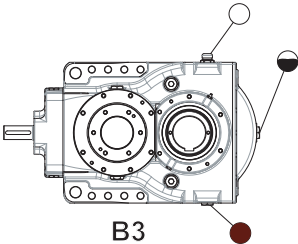
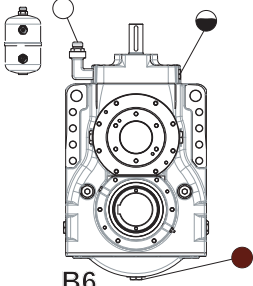
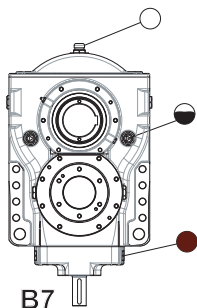
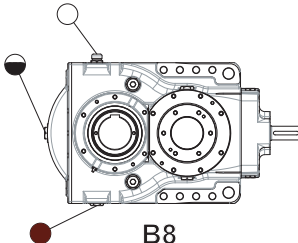
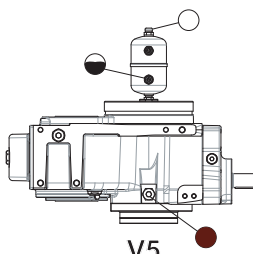
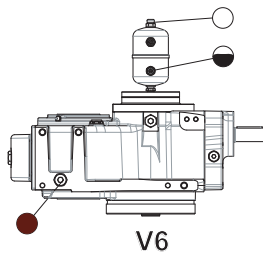
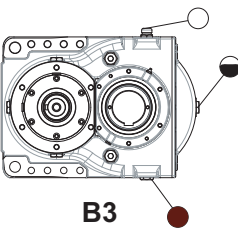
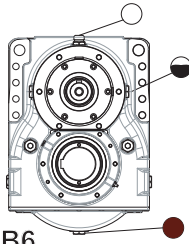
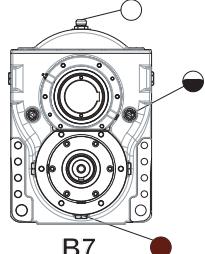
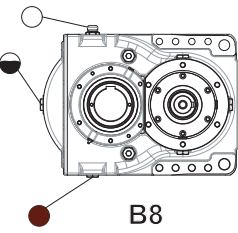
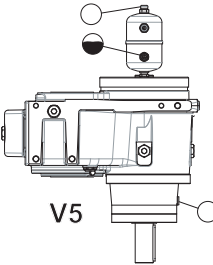
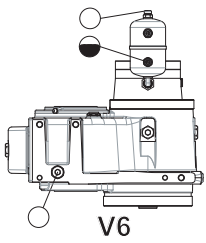
## CODE DESCRIPTION

B	3	L	K	400	160	XX
B=Orthogonal axes; P=Parallel axes	Number of reduction steps	Reduction Size	Output shaft	Nominal ratio	IEC	ratio

# CONFIGURATIONS

## CONFIGURATIONS

SYMBOL	DESCRIPTION
	Magnetic and oil drain plug
	Oil level plug
	Oil breather and filling plug

SERIE BPH		
 B3	 B6	 B7
 B8	 V5	 V6
SERIE PH		
 B3	 B6	 B7
 B8	 V5	 V6



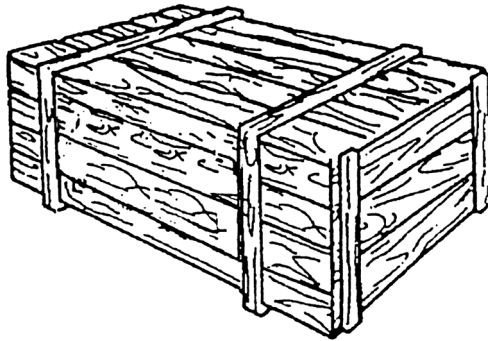
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**DELIVERY STATE:**

Gear units are externally finished with a synthetic nitro-epoxy primer al nitro “RAL 5010”, unless otherwise specified in the sales agreement. Such protection withstands normal industrial environments, including outdoor applications. If the machine is to be used in particularly aggressive conditions, a special paint finish will be required. External machined parts of the gear unit, such as the ends of the hollow and non-hollow shafts, support surfaces, alignment pins, etc. are protected with a rust-inhibitor oil (tectyl). Internal parts of the gear unit casings and drives are also protected with rust-inhibitor oil. Unless otherwise specified in the sales agreement, all gear units are supplied unlubricated; this is clearly stated on an adhesive label attached to the gear unit.

## PACKING, HANDLING, RECEIVING AND STORAGE:

### PACKING

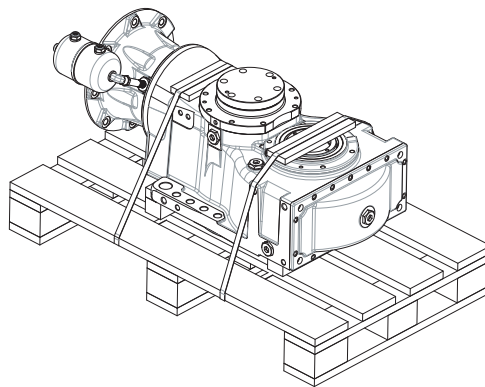


### CAUTION

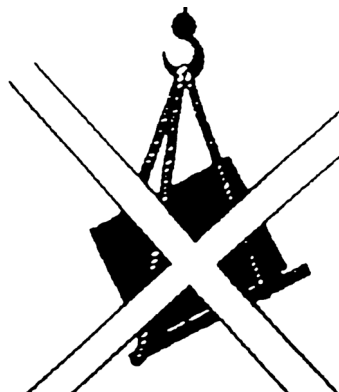
Dana Incorporated products are packed and shipped in crates or on pallets, depending on the specific case.

- Unless otherwise agreed in the sales agreement, all Dana Incorporated products are packed with wrapping that can withstand normal industrial environments.

### HANDLING



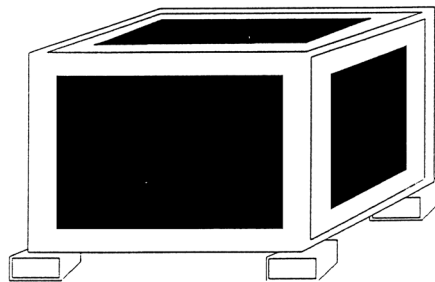
To move packaged gear units, use lifting equipment that is appropriate for the type of packaging and for which the capacity is clearly indicated.



Never tilt or turn the packed gear unit upside down during transport.



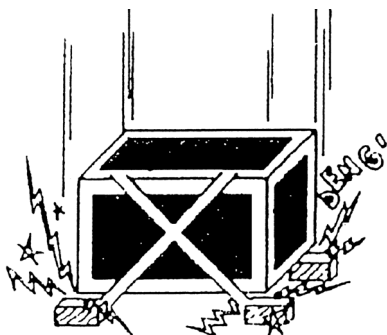
If the packed gear units are unloaded from a fork-lift truck, make sure the weight is balanced on the forks.



If necessary, drive wooden wedges under the crate or pallet to make lifting easier.



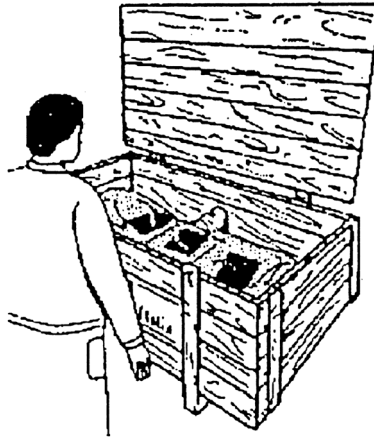
When using a hoist or any lifting system with a hook, make sure that the load is evenly balanced and securely slung and that only approved equipment is used. When gear units are packed on pallets, make sure that the lifting equipment does not damage the gear unit



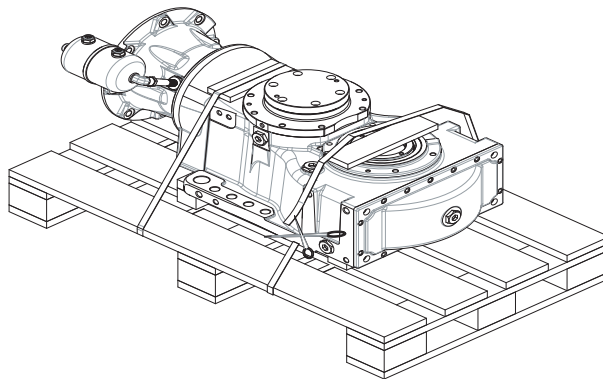
When lifting and moving packages, avoid any violent impacts or bumps.

# RECEPTION

## RECEPTION



On receipt of the machine, check that it corresponds with order specifications, and that the packaging and contents have not been damaged during transport.



### CAUTION

The strap securing the product to the packaging is sharp.

It may hit the operator when the product is unloaded.

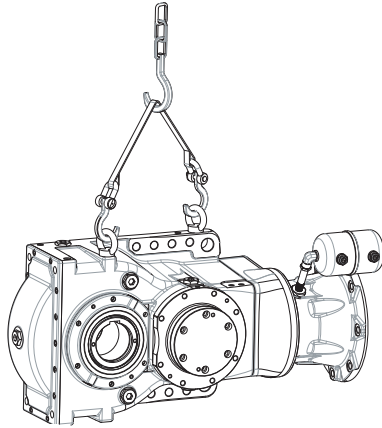
Packaging must be disposed of as follows:

- cut the straps with shears(warning: the ends may hit the operator)
- cut or pull off the wrapping.
- cut the internal strap (warning: the ends may hit the operator)
- remove the machine from the pallets.

Notify the Dana Incorporated Service Department if you find any damage, defects or missing parts, tel. ++390425594162 Fax ++390425585821.

# MOVING THE UNPACKAGED GEAR UNIT

## MOVING THE UNPACKAGED GEAR UNIT

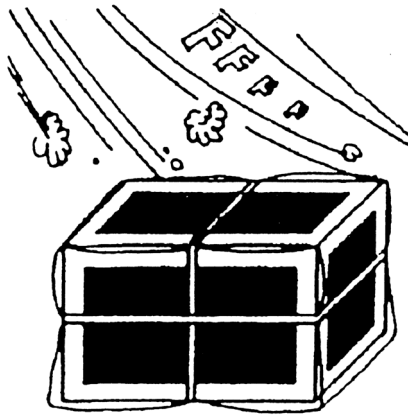


### CAUTION

Before removing the machine from its packing, make sure it is solidly attached to the lifting equipment so that it cannot slide or flip over.

Before moving it, remove the wood blocks inserted in the packing to hold it stable during shipment. Lift the machine making sure the load remains balanced during each operation.

## STORAGE



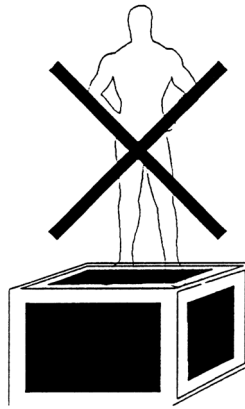
If the product is to be stored for more than two months, proceed as follows:

- Coat the shafts and alignment pins with a film of protective anticorrosion grease or oil.
- Fill the gear unit full with an appropriate oil (see section 7.4).
- Store the gear unit in a dry place at a temperature between  $-5^{\circ}\text{C}$  and  $+30^{\circ}\text{C}$
- Protect the packing from dust, dirt and humidity.

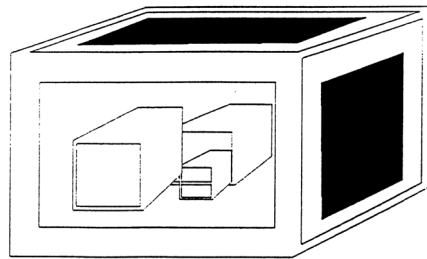
### NOTE:

**When stored for extended periods of more than six months, the rotating seals will deteriorate. It is recommended to check them periodically, turning the internal gears manually and rotating the input shaft. Replace the gaskets when the machine is eventually started up.**

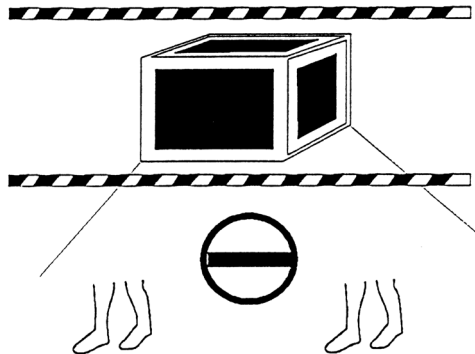
# STORAGE



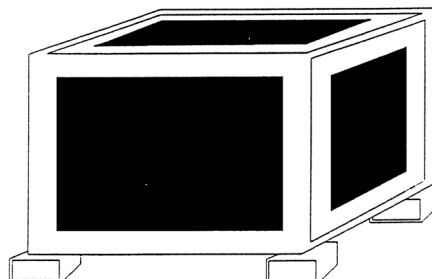
- Do not stack.
- Do not walk on or rest pieces on top of the package.



- Do not store any other materials inside the packing.



- Store the packing well away from pedestrian or vehicular traffic routes.



- If possible, position wooden wedges between the bottom of the packing and the floor.

## INSTALLATION:

### GENERAL INSTRUCTIONS FOR SWINGING ANCHOR SYSTEMS

#### NOTE:

at each stage of the installation, make sure the right type of screws and bolts are used, i.e. compatible with the relative nuts and/or anchoring structures).

The steps listed below must be followed when installing the product:

- During installation, check that the oil, breather, level and drain plugs are in the right position. This will vary depending on the assembly position (see section "Configurations p. 8").
- The gear unit is normally supplied with a flange for coupling the electric, hydraulic and air motors.
- The customer is responsible for installing suitable safety guards around the input and output shafts as well as couplings, pulleys and belts etc. in accordance with applicable safety standards in the country where the machine is used.
- For gear units installed outdoors, use rust-inhibitor paint, protect the oil guard and relative sliding guides with waterrepellent grease and provide appropriate protection against bad weather.
- It is standard practice to grease both shafts using a rustinhibitor lubricant.
- Couplings must be made using suitable equipment.
- If the coupling proves difficult, stop and check alignment and tolerance of the driven machine shaft.

The gear unit was built to be supported by the shaft as a radial or axial load, hence it should be secured to prevent rotation using a restriction free to move in the axial plane. The gear unit must be anchored so that the small radial oscillations present in swinging systems are possible. Elastic components, such as Belleville washers, elastic pads, shock absorbers, articulated stay rods or similar should be used.

These are need to prevent any dangerous additional loads on the gear unit.

Appropriate safety precautions should also be foreseen to prevent damage to people or things:

- breakage of the reaction restrictor and subsequent rotation of the gear unit on the machine shaft.
- accidental breakage of the machine shaft.
- Lubricate hinges and sliding parts using a suitable lubricant.
- Do not carry out any welding work involving the gear unit, even as an earth point.

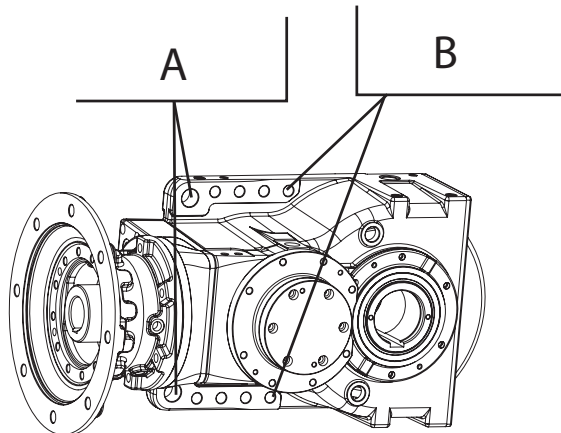
#### NOTE:

Dana Incorporated advises against filling its products with oil prior to installation.

### ASSEMBLY WITH REACTION ARM.

Clean and degrease all surfaces of the gear unit and reaction arm to be coupled; lubricants or paints reduce the friction coefficient, impeding the efficient operation of the application. Also check that there are no dents, welding residues, etc. In addition to the holes to attach the reaction arm, there are also two H7 tolerance holes for calibrated journal pins (see. Fig.1).

Fig. 1

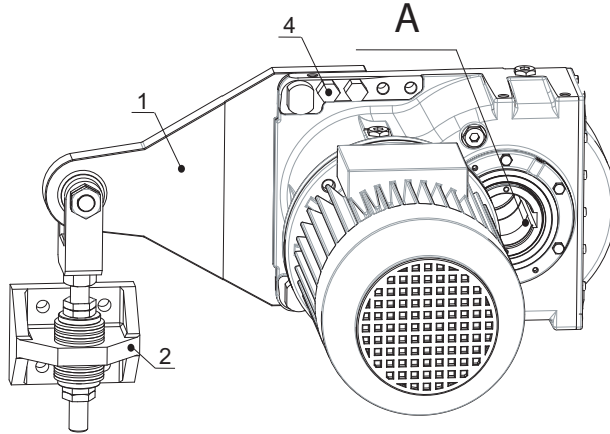


**a** - 1 + 1 H7 tolerance holes for calibrated journal pins

**b** - 4 + 4 holes for anchor bolts with reaction arm.

# GENERAL INSTRUCTIONS FOR SWINGING ANCHOR SYSTEMS

Fit the reaction arm (pos. 1) to the gear unit, securing it with the number of bolts 4) defined at the design stage (minimum recommended class 8.8). Tighten the assembly to the specified torque value shown in "Values Table Torque Setting Bolts p. 32". Clean gear unit and machine shafts carefully (pos. 3) then lubricate them with precision. Fit the gear unit onto the machine shaft following the steps outlined in section 6 "Gear unit installation on various types of machine shaft". Secure the reaction arm to the machine structure (pos. 2) and tighten using the anchor bolts (minimum recommended class 8.8) to the torque value indicated in "Values Table Torque Setting Bolts p. 32" (see Fig. 2).



**a - 3 - Machine shaft Seat**

## ASSEMBLY WITH REACTION ROD

In addition to the standard holes to attach the reaction arm, there are also 1 + 1H7 tolerance holes (pos. 5) for calibrated journal pins when fitting gear units with reaction rod.

Take the reaction arm and align it with the mounting pin holes on the fork of the rod (pos. 4) and with hole H7 (pos. 5) on the gear unit. Insert the calibrated journal pin and tighten it with the nut (pos. 1), leaving the rod free to rotate around the calibrated journal pin. Insert the counternut and tighten it against the nut then tighten both the nut and counternut into each other so that they can't come loose.

Clean the gear unit (pos. 3) and machine shafts carefully then lubricate with care.

Fit the gear unit onto the machine shaft following the steps outlined in section "GEAR UNIT INSTALLATION ON VARIOUS TYPES OF MACHINE SHAFT: p. 19".

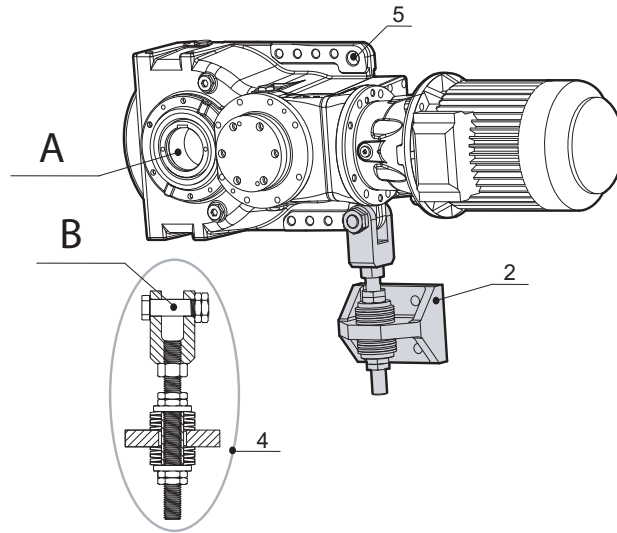
Fit the reaction rod with all components defined at the design stage (Belleville washers, elastic pads, etc. etc.) (pos. 4).

Secure the reaction rod to the machine structure (pos. 2) and tighten with anchor bolts (minimum recommended class 8.8) to the torque value indicated in "Values Table Torque Setting Bolts p. 32" (see Fig. 3).



# GENERAL INSTRUCTIONS FOR SWINGING ANCHOR SYSTEMS

Fig. 3

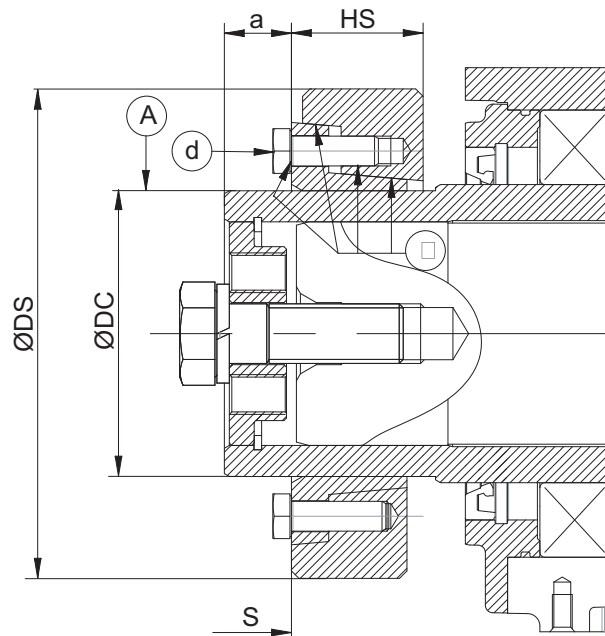


- a** - 3 - Machine shaft Seat
- b** - 1 - calibrated journal pin

## ASSEMBLY WITH COUPLING

- Clean and degrease the internal surface of the gear unit and machine shafts.
- Lubricate the coupling housing (Fig.4 pto. A).
- If the coupling is new there is no need to disassemble it and grease it.
- When servicing the coupling, disassemble it and grease the zones marked "C" (see fig. 4).
- Fit the coupling in its seat on the gear unit shaft without tightening the bolts, positioning it as shown in "a" (see Fig. 4).

Fig. 4



- If the gear unit works in the vertical plane with the relative output shaft facing downwards, make sure the joint cannot slip off and fall; whatever the case, never tighten the bolts before fitting the shaft in its seat.

# GENERAL INSTRUCTIONS FOR SWINGING ANCHOR SYSTEMS

- Fit the gear unit on to the machine shaft or vice versa (excessive axial force shouldn't be necessary); there should be no interference when assembling, so make sure the shaft and gear unit are properly aligned..
- Using a torque wrench, tighten all the bolts gradually working your way round them (sequentially, not switching from side to side) until they have all been tightened to the torque value "Ma" shown in Table 1.
- Set the torque wrench to 3 - 5% above the setting given in table N° 1, then tighten the coupling bolts to the new setting.

GEAR UNIT DIM.	A [MM]	ØDC [MM]	ØDS [MM]	HS [MM]	D [MM]	MA [NM]
16	27	90	155	38	M10	70
18	27	100	170	43	M10	70
20	27	115	197	53	M12	121
23	35	130	215	53	M12	121
25	35	155	263	62	M14	193

Ma (Nm.) = bolt torque

- Set the torque wrench again to setting "Ma" shown in Table 1 then re-check the torque on the coupling bolts, taking care not to tighten them any further. If this happens, repeat the torque sequence.
- When the coupling has been correctly fitted, visually inspect the assembly to make sure that the front surfaces of the inner and outer rings are on the same plane (see Fig. 4 pto. S).

## DISASSEMBLING THE COUPLING.

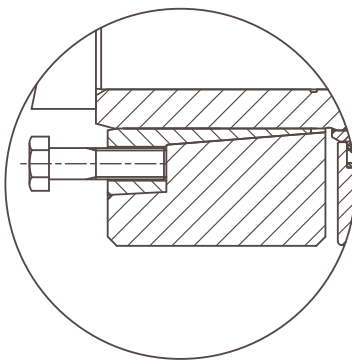
- Gradually loosen the anchor bolts, working your way round in a circle. Loosen each bolt by just a quarter of a turn to start with to avoid bending and seizing.

## ⚠ CAUTION

on account of the high axial force, if the bolts are unscrewed completely in one or two turns, the two rings in the coupling may spring violently apart, putting the operators in danger.

- If the coupling rings don't spring apart naturally after the bolts have been unscrewed, transfer some of the bolts (two bolts at 180° or 4 at 90°) into the internal ring extraction holes (see Fig. 5), giving them no more than one turn a time to tighten them, alternating if there are 2 bolts and in a circle if there are 4.

Fig. 5



## NOTE:

We recommend you use 10.9 or 12.9 class bolts when the application is subject to strong jolts, frequent stops, changes of direction or when 70% of the maximum permitted torque is exceeded.

## GEAR UNIT INSTALLATION ON VARIOUS TYPES OF MACHINE SHAFT:

### GEAR UNITS WITH “K” TYPE SHAFT

#### MACHINE SHAFT WITH SHOULDER:

##### Assembly:

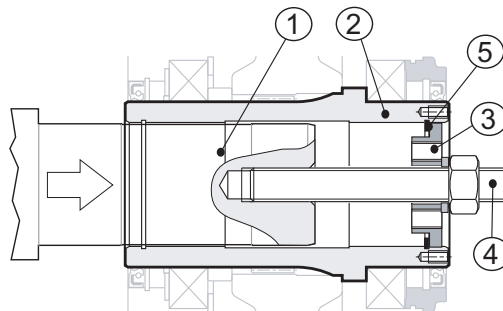
align the axes of the gear unit female shaft (pos. 2) as much as possible with the machine male shaft (pos. 1), then bring the two shafts together after aligning the connecting spline.

Slot them together without exerting too much pressure on each part.

To make sure the female gear unit shaft is tight against the machine shaft use a threaded rod (pos. 4) of an appropriate size.

Now insert the inner seeger retaining ring (pos. 5) then the backplate (pos. 3). Now when you tighten the threaded rod, the two shafts will abut against each other (see Fig. 6).

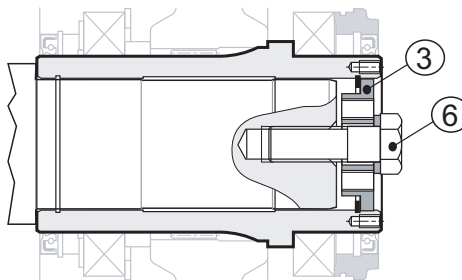
Fig. 6



##### Securing:

unscrew the threaded rod nut (pos. 4) and take it out of its seat. Replace the rod (pos. 4) with screw (pos. 6), torquing it down fully to the torque value shown in "Values Table Torque Setting Bolts p. 32", using an intermediate threadlocker. Dana Incorporated recommends LOCTITE 601 (see Fig. 7).

Fig. 7



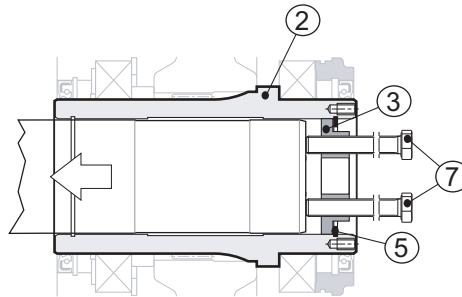
##### Disassembly:

remove the anchor bolt (pos. 6), the backplate (pos. 3) and retaining ring (pos. 5) from their relative seats. Turn the backplate over (pos. 3) and then return it to its seat in the gear unit female shaft (pos. 2) and secure it in position with the inner retaining ring (pos. 5).

Insert 2 bolts (pos. 7) into the two threaded holes on the backplate (pos. 3) (and screw them until they touch the machine shaft (pos. 1). Now give them alternately one full turn each (see Fig. 8).

## GEAR UNITS WITH “K” TYPE SHAFT

Fig. 8



### MACHINE SHAFT WITH NO SHOULDER

#### Assembly:

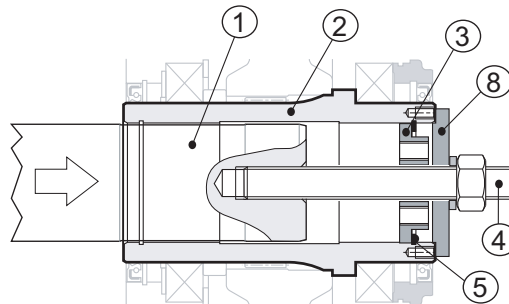
align the axes of the gear unit female shaft (pos. 2) as much as possible with the machine male shaft (pos. 1), then bring the two shafts together after aligning the connecting spline.

Slot them together without exerting too much pressure on each part.

To make sure the female gear unit shaft is tight against the machine shaft use a threaded rod (pos. 4) of an appropriate size.

Now insert the backplate (pos. 3) then the inner retaining ring (pos. 5) into their relative seats and tighten the threaded bar to bring the two shafts tight against each other (see fig.9).

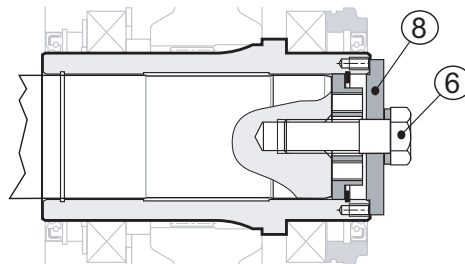
Fig. 9



#### Securing:

unscrew the threaded rod (pos. 4) and take it out of its seat. Replace the rod (pos. 4) with screw (pos. 6), torquing it down fully to the torque value shown in "Values Table Torque Setting Bolts p. 32", using an intermediate threadlocker. Dana Incorporated recommends LOCTITE 601 (see Fig. 11).

Fig. 11

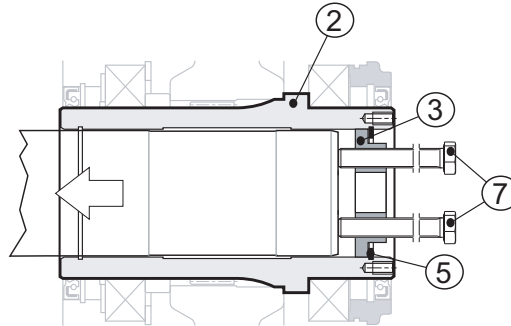


## GEAR UNIT WITH “S” TYPE SHAFT

### Disassembly:

remove the anchor bolt (pos. 6) then the backplate(pos. 8) from their relative seats. Insert 2 bolts (pos. 7) into the two threaded holes on the backplate (pos. 3) (pos. and screw them until they touch the machine shaft (pos. 1). Now give them alternately one full turn each (see figure below).

Fig. 12



## GEAR UNIT WITH “S” TYPE SHAFT

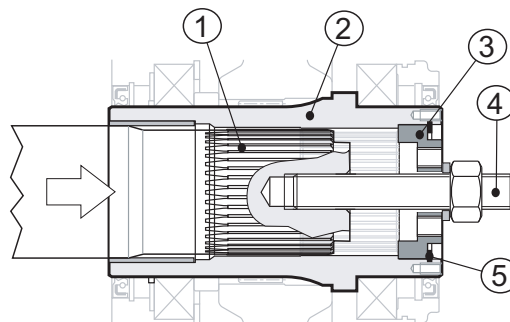
### Assembly:

align the axes of the gear unit female shaft (pos. 2) as much as possible with the machine male shaft (pos. 1), then bring the two shafts together after aligning the connecting toothing. Slot them together without exerting too much pressure on each part.

To make sure the machine shaft rests tight against the backplate (pos. 3) to be subsequently fitted, use a threaded rod (pos. 4) of an appropriate size.

Now insert the backplate (pos. 3) then the inner retaining ring (pos. 5) securing the backplate (pos. 3). Now when you tighten the threaded rod nut, the machine shaft will abut with the backplate (see Fig.13).

Fig. 13

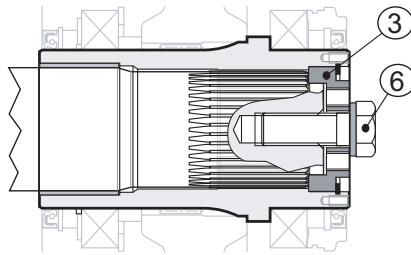


### Securing:

unscrew the threaded rod nut (pos. 4) and take it out of its seat. Replace the rod (pos. 4) with screw (pos. 6), torquing it down fully to the torque value shown in "Values Table Torque Setting Bolts p. 32", using an intermediate threadlocker. Dana Incorporated recommends LOCTITE 601 (see Fig. 14).

# GEAR UNITS WITH “D” TYPE SHAFT

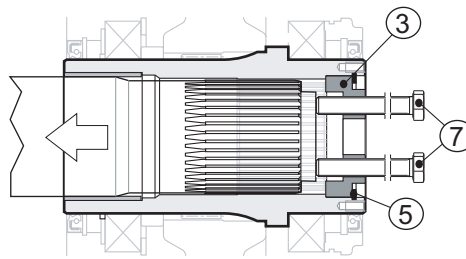
Fig. 14



## Disassembly:

remove the anchor bolt (pos. 6) from its relative seat. Insert 2 bolts (pos. 7) into the two threaded holes on the backplate (pos. 3) and screw them until they touch the machine shaft (pos. 1). Now give them alternately one full turn each (see Fig. 15).

Fig. 15



# GEAR UNITS WITH “D” TYPE SHAFT

## MACHINE SHAFT WITH SHOULDER:

### Assembly:

Lubricate the coupling seat (pos.9) on the gear unit female shaft (pos. 2), then take the coupling and insert it into its seat without tightening the bolts.

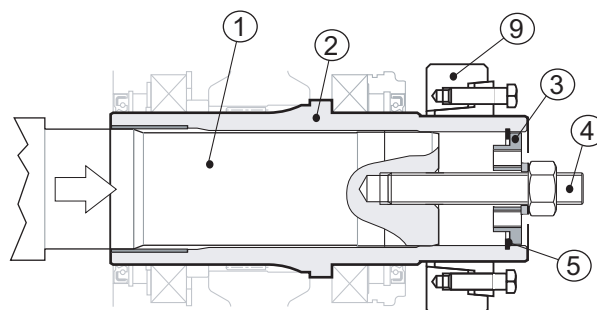
Align the axes of the gear unit female shaft (pos. 2) as much as possible with the machine male shaft (pos. 1), then bring the two shafts together.

Slot them together without exerting too much pressure on each part.

To make sure the female gear unit shaft is tight against the machine shaft use a threaded rod (pos. 4) of an appropriate size.

Now insert the inner seeger retaining ring (pos. 5) then the backplate (pos. 3). Now when you tighten the threaded rod, the two shafts will abut against each other (see Fig. 16).

Fig. 16



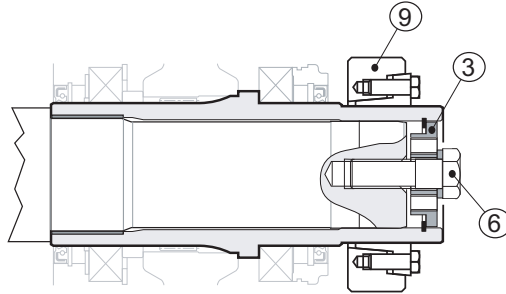
# GEAR UNITS WITH "D" TYPE SHAFT

## Securing:

unscrew the threaded rod nut (pos. 4) and take it out of its seat. Replace the rod (pos. 4) with screw (pos. 6), torquing it down fully to the torque value shown in "Values Table Torque Setting Bolts p. 32", using an intermediate threadlocker. Dana Incorporated recommends LOCTITE 601.

For instructions on how to secure the coupling, see section "Assembly with coupling p. 17" (see Fig. 17).

Fig. 17



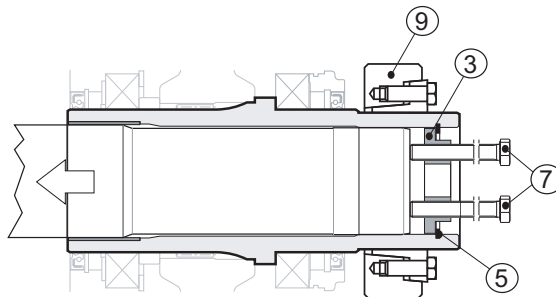
## Disassembly:

the first thing to do is remove the coupling. For instructions on how to do this, see section "Disassembling the coupling. p. 18". Disassembling the coupling. Remove the anchor bolt (pos. 6), the backplate (pos. 3) and the seeger retaining ring (pos. 5) from their relative seats.

Turn the backplate over (pos. 3) and return it to its seat in the gear unit female shaft, securing it by inserting the retaining ring (pos. 5).

Insert 2 bolts (pos. 7) into the two threaded holes on the backplate (pos. 3) and screw them until they touch the machine shaft (pos. 1). Now give them alternately one full turn each (see Fig. 18).

Fig. 18



## MACHINE SHAFT WITH NO SHOULDER

### Assembly:

Lubricate the coupling seat (pos.9) on the gear unit female shaft (pos. 2), then take the coupling and insert it into its seat without tightening the bolts.

Align the axes of the gear unit female shaft (pos. 2) as much as possible with the machine male shaft (pos. 1), then bring the two shafts together.

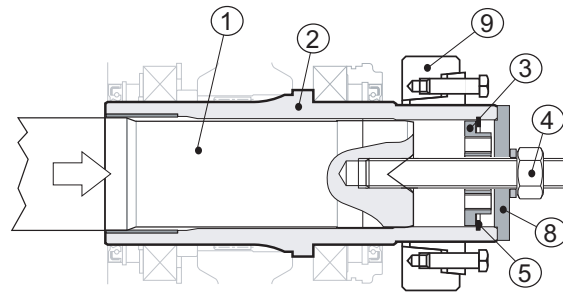
Slot them together without exerting too much pressure on each part.

To make sure the female gear unit shaft is tight against the machine shaft use a threaded rod (pos. 4) of an appropriate size.

Now insert the backplate (pos. 3), the inner retaining ring (pos. 5) and the backplate (pos. 8). Now when you tighten the threaded rod nut, the two shafts will abut against each other (see Fig. 19).

# GEAR UNITS WITH “D” TYPE SHAFT

Fig. 19

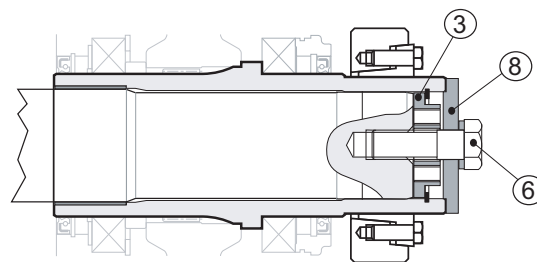


## Securing:

unscrew the threaded rod nut (pos. 4) and take it out of its seat. Replace the rod (pos. 4) with screw (pos. 6), torquing it down fully to the torque value shown in "Values Table Torque Setting Bolts p. 32", using an intermediate threadlocker. Dana Incorporated recommends LOCTITE 601.

For instructions on how to secure the coupling, see section "Assembly with coupling p. 17" (see Fig. 20).

Fig. 20

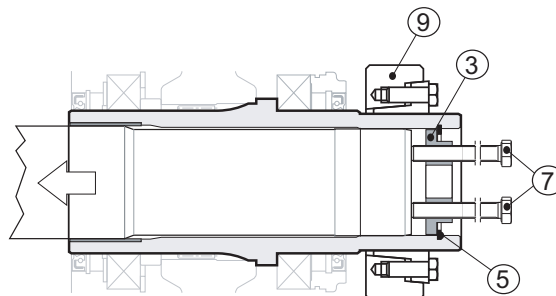


## Disassembly:

the first thing to do is remove the coupling. For instructions on how to do this, see section "Disassembling the coupling. p. 18". Disassembling the coupling. Remove the anchor bolt (pos. 6) and the backplate (pos. 8) from their relative seats.

Insert 2 bolts (pos. 7) into the two threaded holes on the backplate (pos. 3) and screw them until they touch the machine shaft (pos. 1). Now give them alternately one full turn each (see Fig. 21).

Fig. 21





---

## ACCESSORY INSTALLATION INSTRUCTIONS:

### MOTOR ASSEMBLY:

Remove any traces of paint from the surfaces (S) of the motor and motor flange to be coupled.

Check that there are no dents, machining defects, etc. on surfaces, alignment pins, shafts and holes.

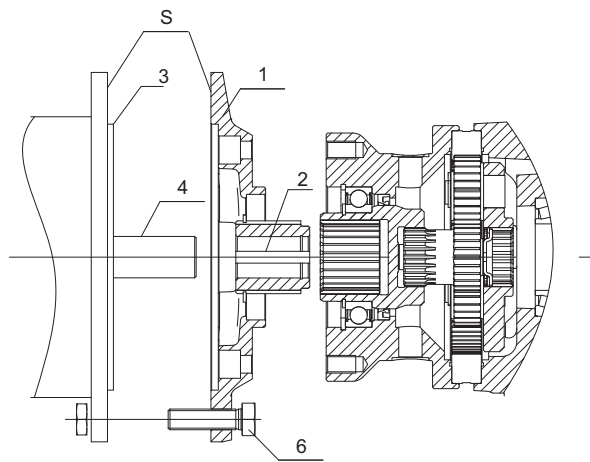
When fitting the gear unit to the motor, lubricate the joint with a thin layer of grease or no-grip lubricant

### “UNIVERSALE 00” VERSION:

Insert the coupling half (pos. 2) to the motor shaft (pos. 4), then align the coupling half grooves with the connecting ones on the pinion then fit the coupling half into the pinion, making sure that the motor spigot (pos. 3) is perfectly aligned with the motor flange spigot (pos. 1).

Once you're sure the motor is well-aligned, tighten all the anchor bolts to the torque value listed in section "Values Table Torque Setting Bolts p. 32" (see Fig. 22).

Fig. 22



### “CENTRAL JOINT” VERSION:

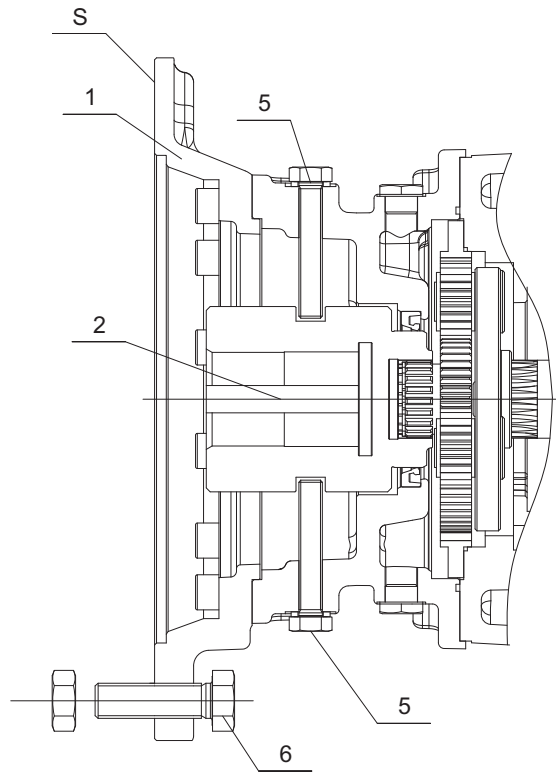
in this version, if you want to disassemble the coupling half (pos. 2) when connecting to the motor but have already filled the gear unit with oil, you need to be careful because when you remove the coupling half, the oil may escape from the gear unit. So, to remove the coupling half (pos. 2) you must first loosen the two bolts (pos. 5).

Insert the coupling half (pos. 2) onto the motor shaft (pos. 4), align the central joint grooves with the connecting ones on the pinion then insert the central joint into the pinion, being very careful not to damage the rotating retaining ring and making sure that the motor spigot (pos. 3) is perfectly aligned with the motor flange spigot (pos. 1).

Once you're sure the motor is well-aligned, tighten all the anchor bolts to the torque value listed in section "Values Table Torque Setting Bolts p. 32" (see Fig. 23).

## ACCESSORY INSTALLATION INSTRUCTIONS:

Fig. 23



### **NOTE:**

Dana Incorporated recommends you assemble the motor with the central joint in position because in refitting it you could damage the rotating retaining ring.

## ACCESSORY INSTALLATION INSTRUCTIONS:

To mount pinions, pulleys or couplings, use suitable equipment to avoid seizing; alternatively, you can heat the relative component to 80° - 100° C.

Lubricate the grooves with a thin layer of grease or a no-grip lubricant and tighten anchor bolts to the torque value listed in section "Values Table Torque Setting Bolts p. 32".

## LUBRICATION:

### GEAR UNIT LUBRICATION

#### NOTE:

Dana Incorporated gear units are not filled with oil when supplied therefore users should select an appropriate lubricant in accordance with the table in section "Lubricant table p. 30".

#### Basic oil specifications

Oils should be selected on the basis of the following parameters:

- viscosity under nominal operating conditions
- additives

The oil must lubricate the bearings and the gears, bearing in mind that these components work in the same box, but under different operating conditions. We will look at these parameters one by one.

#### VISCOSITY

Dana Incorporated recommends gear oils with EP additive (Extreme Pressure) and 40° VG viscosity index of at least 150 cTS. Oil viscosity at operating temperature must always be greater than 50cTS.

Viscosity values under 50cTS could shorten the running life of gears and bearings.

The table below lists recommended oils for various operating oil temperatures in the gear unit. For temperatures above 80°C or for huge swings in temperatures, synthetic lubricants are recommended.

OPERATING OIL TEMPERATURE [°C]	RECOMMENDED LUBRICANT
10° ÷ 35°	ISO VG150 Mineral
30° ÷ 50°	ISO VG220 Mineral
50° ÷ 80°	ISO VG320 Mineral
- 10° ÷ - 45°	ISO VG150 Synthetic
20° ÷ 60°	ISO VG220 Synthetic
50° ÷ 90°	ISO VG320 Synthetic

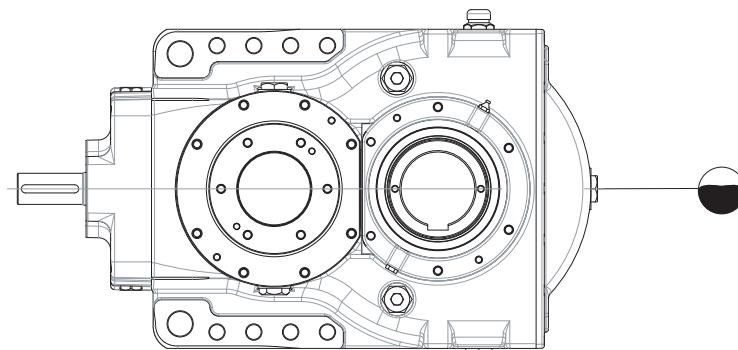
#### ADDITIVES

In addition to standard anti-foaming and anti-oxidant additives, it is important to use lubricating oils with additives that have EP (Extreme Pressure) and anti-wear properties, and that conform to ISO 6743-6 L-CKC or DIN 51517-3 CLP. Clearly, the slower the gear unit speed, the stronger the EP characteristics the product must have. Not to be overlooked is that fact that the chemical compounds replacing hydrodynamic lubrication are formed to the detriment of the original EP load. In low speed, high load applications, regular maintenance intervals must be respected to prevent the oil losing its lubricating properties.

#### Checking oil with non-forced lubrication

If the gear unit is fitted horizontally, to ensure proper lubrication, the oil level should be at the centre (see fig. 24).

Fig. 24



# EXPANSION TANK

## Topping up

- Gear units have oil level, breather, filling and drain plugs, and are located depending on the installation configuration.
- Check their exact position on the diagrams provided in section "Configurations p. 8".
- Unscrew the level and drain plugs, fill the gear unit with oil and when it flows out of the level hole, retighten the plugs.
- Turn the gear unit a few times to get rid of any air pockets then check the levels again.

## EXPANSION TANK

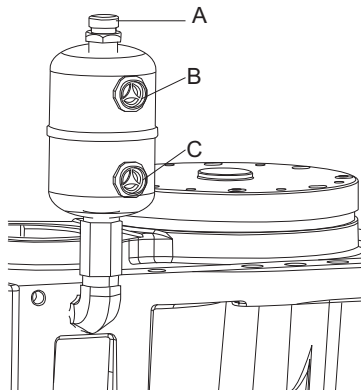
### IMPORTANT:

**CHECK THAT THE EXPANSION TANK IS INSTALLED HIGHER THAN THE TOP PART OF THE GEAR UNIT.**

Follow the steps below for applications with expansion tank: (see Fig. 25).

- Remove plug "A"
- To help air the gear unit (only during filling), one of the plugs on the top of the unit can be removed.
- As the oil reaches the top of the open plug in the top part of the gear unit, replace the plug.
- Keep filling until the oil reaches the min. visual level plug on the tank (fill to just above this level).
- Replace the plug.
- Never fill as far as the max visual oil level to leave room for the hot oil to expand.
- Turn the gear unit a few times to get rid of any air pockets then check the levels again.

Fig. 25



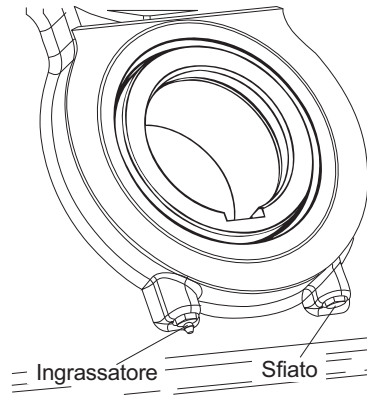
**a** - "A" breather

**b** - MAX. level

**c** - MIN. level

In some configurations, the retaining rings or accessories need to be lubricated separately with grease. This can be done using the grease guns on the gear unit casing (see Fig. 26). This should be repeated on a regular basis. When lubricating is done automatically, a breather plug should be fitted to prevent any excess pressure from building up in the separate grease lubrication chamber.

Fig. 26



Type of soap:	Stearate hydroxide lithium 12 or equivalent.
Consistency:	NLGI No. 2
Base oil:	Mineral oil with viscosity from 100 to 320 cST at 40° C.
Additives:	Corrosion or rust inhibitors
Viscosity index:	80 minimum
Pour point:	-10 °C maximum

# LUBRICANT TABLE

## LUBRICANT TABLE

LUBRICANT	MINERAL		
	ISO VG 150	ISO VG 220	ISO VG 320
Agip	Blasia 150	Blasia 220	Blasia 320
Aral	Drgol BG 150	Drgol BG 220	Drgol BG 320
BP	Energol GR-XP 150	Energol GR-XP 150	Energol GR-XP 150
Castrol	Alphamax 150	Alphamax 220	Alphamax 320
Cepsa	Engranajes HP 150	Engranajes HP 220	Engranajes HP 320
Dea	Falcon CLP 150	Falcon CLP 220	Falcon CLP 320
Elf LubMarine	Epona Z 150	Epona Z 220	Epona Z 320
Esso	Spartan EP 150	Spartan EP 220	Spartan EP 320
Fuchs	Renep Compound 104	Renep Compound 106	Renep Compound 108
Fuchs Lubritech	Gearmaster CLP 150	Gearmaster CLP 220	Gearmaster CLP 320
Klüber	Klüberoil GEM 1-150	Klüberoil GEM 1-220	Klüberoil GEM 1-320
Mobil	Mobilgear XMP 150	Mobilgear XMP 220	Mobilgear XMP 320
Nils	Ripress EP 150	Ripress EP 220	Ripress EP 320
Omv	Gear HST 150	Gear HST 220	Gear HST 320
Optimol	Optigear BM 150	Optigear BM 220	Optigear BM 320
Q8	Goya NT 150	Goya NT 220	Goya NT 320
Repsol	Super Tauro 150	Super Tauro 220	Super Tauro 320
Shell	Omala 150	Omala 220	Omala 320
Texaco	Meropa 150	Meropa 220	Meropa 320
TotalFinaElf	Carter EP 150	Carter EP 220	Carter EP 320
Tribol	1100 - 150	1100 - 220	1100 - 320

LUBRICANT	SYNTHETIC		
	ISO VG 150	ISO VG 220	ISO VG 320
Agip	-	Blasia SX 220	Blasia SX 320
Aral	Drgol PAS 150	Drgol PAS 220	Drgol PAS 320
BP	Enersyn EXP 150	Enersyn EXP 220	Enersyn EXP 320
Castrol	Alphasyn EP 150	Alphasyn EP 220	Alphasyn EP 320
Cepsa	Engranajes HPX 150	Engranajes HPX 220	Engranajes HPX 320
Dea	Intor HCLP 150	Intor HCLP 220	Intor HCLP 320
Elf LubMarine	-	Epona SA 220	Epona SA 320
Esso	Spartan SEP 150	Spartan SEP 220	Spartan SEP 320
Fuchs	Renolin unisyn CLP 150	Renolin unisyn CLP 220	Renolin unisyn CLP 320
Fuchs Lubritech	Gearmaster SYN 150	Gearmaster SYN 220	Gearmaster SYN 320
Klüber	Klübersynth EG 4-150	Klübersynth EG 4-220	Klübersynth EG 4-320
Mobil	MobilgearSHC XMP 150	MobilgearSHC XMP 150	MobilgearSHC XMP 150
Nils	-	Atoil synth 220	-
Omv	-	Gear SHG 220	Gear SHG 320

# LUBRICANT TABLE

LUBRICANT	SYNTETIC		
	ISO VG 150	ISO VG 220	ISO VG 320
Optimol	Optigear synthetic A 150	Optigear synthetic A 150	Optigear synthetic A 150
Q8	El Greco 150	El Greco 220	El Greco 320
Shell	Omala HD 150	Omala HD 220	Omala HD 320
Texaco	Pinnacle EP 150	Pinnacle EP 220	Pinnacle EP 320
TotalFinaElf	Carter SH 150	Carter SH 220	Carter SH 320
Tribol	1510 - 150	1510 - 220	1510 - 320

**Table of lubricant oils suitable for alimentary use**  
**(Approved according to USDA-H1 and NSF-H1 specifications)**

LUBRICANT	HYDRAULIC OILS			GEAR OILS		
	ISO VG 32	ISO VG 46	ISO VG 68	ISO VG 150	ISO VG 220	ISO VG 320
Agip	Rocol Foodlube H1 power 32	-	-	Rocol Foodlube H1 Torque 150	-	Rocol Foodlube H1 Torque 150
ARAL	Eural Hyd 32	Eural Hyd 46	Eural Hyd 68	Eural Gear 150	Eural Gear 220	Eural Gear 320
Bel-Ray	No-Tox HD Hydr Oil 32	No-Tox HD Hydr Oil 46	No-Tox HD Hydr Oil 68	No-Tox Syn Gear 150	No-Tox Syn Gear 220	No-Tox Syn Gear 320
BP	Enerpar M 32	Enerpar M 46	Enerpar M 68	-	-	-
CHEVRON	Lubricating Oil FM 32	Lubricating Oil FM 46	Lubricating Oil FM 68	-	Lubricating Oil FM 220	-
Esso	Nuto FG 32	Nuto FG 46	Nuto FG 68	-	Gear oil 220	-
Keystone	Nevastane SL 32	Nevastane SL 46	Nevastane SL 68	Nevastane EP 150	Nevastane EP 220	Nevastane EP 320
KLÜBER	Klüberfood 4 NH1 - 32	Klüberfood 4 NH1 - 46	Klüberfood 4 NH1 - 68	Klüberfood 4 UH1 - 150N	Klüberfood 4 UH1 - 220N	Klüberfood 4 UH1 - 320N
MOBIL	Mobil SHC Cibus 32	Mobil SHC Cibus 46	Mobil SHC Cibus 68	Mobil SHC Cibus 150	Mobil SHC Cibus 220	Mobil SHC Cibus 320
NILS	Mizar 32	Mizar 46	Mizar 68	Ripress Synt Food 150	Ripress Synt Food 220	Ripress Synt Food 320
Optimol	Optileb HY 32	Optileb HY 46	Optileb HY 68	Optileb GT 150	Optileb GT 220	Optileb GT 320
Pakelo	No-Tox Oil Hydr. ISO 32	No-Tox Oil Hydr. ISO 46	No-Tox Oil Hydr. ISO 68	No-Tox Oil Gear ISO 150	No-Tox Oil Gear ISO 220	No-Tox Oil Gear ISO 320
Royal Purple	Poly-Guard FDA 32	Poly-Guard FDA 46	Poly-Guard FDA 68	Poly-Guard FDA 150	Poly-Guard FDA 220	Poly-Guard FDA 320
Shell	Cassida Fluid HF 32	Cassida Fluid HF 46	Cassida Fluid HF 68	Cassida Fluid GL 150	Cassida Fluid GL 220	Cassida Fluid GL 320
TEXACO	Cygnus Hydraulic Oil 32	Cygnus Hydraulic Oil 46	Cygnus Hydraulic Oil 68	Cygnus Gear PAO 150	Cygnus Gear PAO 220	Cygnus Gear PAO 320
TRIBOL	Food Proof 1840 / 32	Food Proof 1840 / 46	Food Proof 1840 / 68	-	Food Proof 1810 / 220	Food Proof 1810 / 320

## CHECKS:

### FIRST START-UP CHECKS

Before starting the machine, check the following:

- Check that all oil plugs are correctly positioned, see section "Configurations p. 8".
- Check that all oil levels are correct.
- Check that all the grease guns are full of grease.
- When controlled rotation devices are used, check that the direction of free rotation is correct.
- When "auxiliary commands" are present, check that:

When the main motor is running, a "free rotation" device releases the auxiliary motor.

When the auxiliary motor is running, the main drive shaft of the gear unit is slowly driven by this motor.



### CAUTION

gear units are not filled with oil when supplied therefore customers should see to this (see section "LUBRICATION: p. 27").

- Check all bolts with ISO metric threading are tightened to the correct torque (see "Values Table Torque Setting Bolts p. 32").

### VALUES TABLE TORQUE SETTING BOLTS

D X P MM.	4.8		5.8		8.8		10.8		12.9	
	kN	Nm	kN	Nm	kN	Nm	kN	Nm	kN	Nm
3x0,5	1.2	0.9	1.5	1.1	2.3	1.8	3.4	2.6	4.0	3
4x0,7	2.1	1.6	2.7	2	4.1	3.1	6.0	4.5	7.0	5.3
5x0,8	3.5	3.2	4.4	4	6.7	6.1	9.8	8.9	11.5	10.4
6x1	4.9	5.5	6.1	6.8	9.4	10.4	13.8	15.3	16.1	17.9
7x1	7.3	9.3	9.0	11.5	13.7	17.2	20.2	25	23.6	30
8x1	9.9	14.5	12.2	18	18.9	27	28	40	32	47
9x1,25	9.3	13.6	11.5	16.8	17.2	25	25	37	30	44
10x1,5	14.5	26.6	18	33	27	50	40	73	47	86
10x1,25	15.8	28	19.5	35	30	53	43	78	51	91
12x1,25	23.8	50	29	62	45	95	65	139	77	163
12x1,75	21.3	46	26	56	40	86	50	127	69	148
14x1,5	32	79	40	96	61	150	90	220	105	257
14x2	29	73	36	90	55	137	80	201	94	235
16x1,5	43	121	54	150	82	229	121	336	141	393
16x2	40	113	50	141	76	214	111	314	130	369
10x2,5	49	157	60	194	95	306	135	435	158	509
18x1,5	57	178	70	220	110	345	157	491	184	575
20x2,5	63	222	77	275	122	432	173	615	203	719
20x1,5	72	248	89	307	140	482	199	687	233	804
22x2,5	78	305	97	376	152	502	216	843	253	987
22x1,5	88	337	109	416	172	654	245	932	266	1090
24x3	90	383	112	474	175	744	250	1080	292	1240
24x2	101	420	125	519	196	814	280	1160	327	1360
27x3	119	568	147	703	230	1100	328	1570	384	1840
27x2	131	615	162	760	225	1200	363	1700	425	1990



## NO-LOAD TESTS

D X P MM.	4.8		5.8		8.8		10.8		12.9	
	kN	Nm	kN	Nm	kN	Nm	kN	Nm	kN	Nm
30x3,5	144	772	178	955	280	1500	300	2130	467	2500
30x2	165	850	204	1060	321	1670	457	2370	535	2380

d = bolt diameter

p = bolt pitch

kN = axiale pre-loading

Nm = torque setting bolts

### NO-LOAD TESTS

- After a short running time (5-10 minutes), check oil levels under no-load conditions, topping up any that have gone down and checking that all anchor nuts and bolts are properly tightened.

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## MAINTENANCE:

### Introduction

Maintenance can be routine or unscheduled.



All maintenance must be carried out in safety.

### ROUTINE MAINTENANCE

Operators are responsible for routine maintenance, to be performed as indicated below.

- After a short running time (approx. 100 hours running in), change the oil in the gear unit and wash the inside with cleaning fluid.
- Check that there are no metal parts of unusual sizes in the magnetic plug of the gear unit.
- Change the oil in the gear unit while it is hot to ensure it drains completely.
- Subsequent oil changes should be done every 2000 - 2500 hours running time for mineral oils and every 8000 - 10,000 hours for synthetic oils, and in both cases, in accordance with the actual state of the gear unit and as indicated by the lubricant manufacturer.
- Do not mix different types of oil.
- Check oil levels (about once a month) and top up as required.
- We recommend you keep a chart for each unit to be filled out and updated each time maintenance is performed.

### OIL CHANGE

- Use the diagrams in section "Configurations p. 8" to locate the oil drain plug for the particular gear unit configuration concerned.
- Unscrew the drain and filler plugs to help the oil drain from the gear unit. Once it is empty, replace the drain plug.
- Wash the inside of the gear unit with a suitable cleaning fluid recommended by the lubricant manufacturer following the steps below:

Pour the liquid into the gear unit then replace the fill plugs; run the unit for a few minutes at high speed then empty the cleaning fluid.

- See section "LUBRICATION: p. 27" for filling instructions.

### UNSCHEDULED MAINTENANCE

Dana Incorporated prohibits the gear unit from being opened for anything else other than routine maintenance. Dana Incorporated declines all liability for any injury to persons or damage to objects resulting from anything else other than routine maintenance. If necessary, contact your nearest Dana Incorporated Service Centre from the list on "SERVICE NETWORK p. 38".

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## **SCRAP DISPOSAL:**

### **MACHINE DEMOLITION**

To scrap the machine, first make sure it can no longer function:

- Disassemble components.
- Disconnect motor units.

Make sure you have emptied the oil completely from the gear unit first.

### **ECOLOGICAL INFORMATION**

Packing materials, spare parts, components, lubricants or the gear unit itself must be disposed of in accordance with environmental restrictions, without polluting the soil, water or air. The party receiving the materials is responsible for doing this in compliance with applicable regulations in the country in which the machine is used.

#### **Instructions for suitable waste treatment**

- Iron, aluminium and copper: being recyclable, these materials should be sent to an authorized disposal centre.
- Plastic and rubber: must be taken to a dump or special recycling centre.
- Used oils: take to special C.Di.R.A (used oil disposal centre in Italy).

## TROUBLESHOOTING:

Use the following table to troubleshoot any faults or malfunctions. If the problem persists, contact your nearest Brevini Service Centre (see "SERVICE NETWORK p. 38").

PROBLEM	POSSIBLE CAUSE	SOLUTION
With motor running the output shaft doesn't turn	Incorrect motor assembly	Check coupling between gear unit motor
	Internal malfunction	Contact a Dana Incorporated Service Centre
	Brake blocked	Check command circuit
Oil leak from breather during operation	Level too high	Lower oil level
	Incorrect breather position	Check breather position
Oil leak from seals	Clogged breather plug	Unscrew and thoroughly clean the plug
	Stiffening of seals due to prolonged storage	Clean the area and check for leakage again after a few days
	Damaged or worn seals	Contact a Dana Incorporated Service Centre
Excessive vibrations	Gear unit incorrectly installed	Check machine shaft
	Not anchored securely enough	Strengthen the structure
	Internal malfunction	Contact a Dana Incorporated Service Centre
Excessive noise	No lubricant	Check
	Internal malfunction	Contact a Dana Incorporated Service Centre
Excessive heating	No ventilation	Remove fairing
	High thermal power	Insert oil circulation

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## **CONFORMITY CERTIFICATE - UNI EN 10204 - 2.1**

Dana Incorporated under its own responsibility, on the basis of the results of its standard tests aimed to verify products which are manufactured using the same materials and production method, declares that the products comply fully with the order requirements and with all technical norms corresponding to the official regulations.





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