DANA BREVINI® Motion Systems

Installation and Maintenance Manual

Winch Drives (MTF410000)

IMM-0006EN
May 2021

DISCLAIMER

The official language chosen by the Product manufacturer is English. No liability is assumed as a result of translations in other languages not in compliance with the original meaning. In case of conflicting language versions of this document, the English original prevails. Dana shall not be liable for any misinterpretation of the content here into. Photos and illustrations might not represent the exact product.

TABLE OF CONTENTS

INTRODUCTION

Thank you for choosing a Dana Incorporated product, we are pleased to include you as one of our preferred customers.
We hope you will be completely satisfied with all aspects of your new gearbox.

HOW TO CONSULT THE MANUAL

To consult this manual, refer to the table of contents on the first page to find the subject of interest quickly. The chapters are arranged in a hierarchical structure that makes it easier to find the information you need.

SCOPE OF THE MANUAL

This manual provides the gearbox user with all the necessary information for the correct installation, use and maintenance of the unit in compliance with the safety limits prescribed in statutory legislation. To aid understanding of the manual, please consult the following glossary of terms:

DANGER ZONE:

area inside or near the machine in which the presence of an exposed person constitutes a risk for the safety and health of said person.

EXPOSED PERSON:

any person who is partly or entirely inside a danger zone

OPERATOR:

person responsible for installing, running, adjusting, performing routine maintenance, and cleaning the machine.

SKILLED TECHNICIAN:

a specialized person responsible for performing supplementary maintenance or repairs that call for special knowledge of the machine, its operation, the safety devices, and their operating modes.

⚠ CAUTION

Safety prescriptions for the operator.

⚠ WARNING

Risk of damage to the machine and/or its parts.

NOTICE

Additional information concerning the current operation.

NOTE:

Useful information.

If your are in doubt, or if the manual has been damaged or lost, please do not hesitate to contact the Dana Incorporated Technical Service Department.

WARRANTY CONDITIONS

WARRANTY CONDITIONS

Dana Incorporated guarantees its products for 12 months of operation from the time of start-up; the warranty is applicable up to a maximum term of 18 months from the date of shipment.

The warranty will no be valid if problems or malfunctions are caused by incorrect or unsuitable applications in relation to the product, or if the product has been altered before the time of start-up.

- The Dana Incorporated warranty is limited to the repair or replacement of products recognized as being defective once Dana Incorporated has checked their condition.
- Dana Incorporated assumes no liability for any damages, either material or economic in nature, deriving from product defects. The sole responsibility assumed is for the repair or replacement of the product.
- The operating environment and application for which the gearbox is used must comply with the intended use specified during the design phase.
- Improper use of the gearbox is strictly prohibited.
- Any modification or replacement of parts of the unit, unless specifically authorized by Dana Incorporated, may result in the risk of accidents and will release the manufacturer from all civil or criminal liability and invalidate the warranty.

GENERAL PRESCRIPTIONS

Personnel must be informed of the following subjects regarding machine operating safety:

- Accident risks.
- Personal protective equipment: goggles, gloves, hard-hat, etc. (PPE), to protect operator safety.
- General accident-prevention regulations or regulations set forth in international directives and by the laws of the country in which the machine will be used.
- When delivered, check that the gearbox has not been damaged during transport and that all accessories are present.
- Before starting work, the operator must be familiar with the features of the machine and must have read this manual in its entirety.
- The gearbox must be used in an environment and for an application that comply with the intended use specified during the design phase.
- Improper use of the gearbox is strictly prohibited.
- Any modification or replacement of parts of the unit, unless specifically authorised by Dana Incorporated, may result in the risk of accidents and will release the manufacturer from all civil or criminal liability and invalidate the warranty.

REPRODUCTION AND COPYRIGHT RESTRICTIONS

REVISIONS

Subsequent revisions of the manual will be issued following functional modifications or replacements affecting the machine.

TRACKING LIST

FILE NAME	REV.	DATE	DESCRIPTION
Manual Winch Drives	00	14/11/2006	Document issued
IMM-0006EN Winch Drives (MFT410000)	01	16/10/2018	- Changed layout - Updated "TECHNICAL DATA(p. 7)"

MODELS

TECHNICAL DATA

Each gearbox is supplied with an identification nameplate and a manufacturer's declaration (as per enclosure 2B) prepared in compliance with EEC Directive 392 and subsequent amendments.

The identification nameplate contains the main technical data regarding the functional and construction features of the gearbox and it must therefore 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

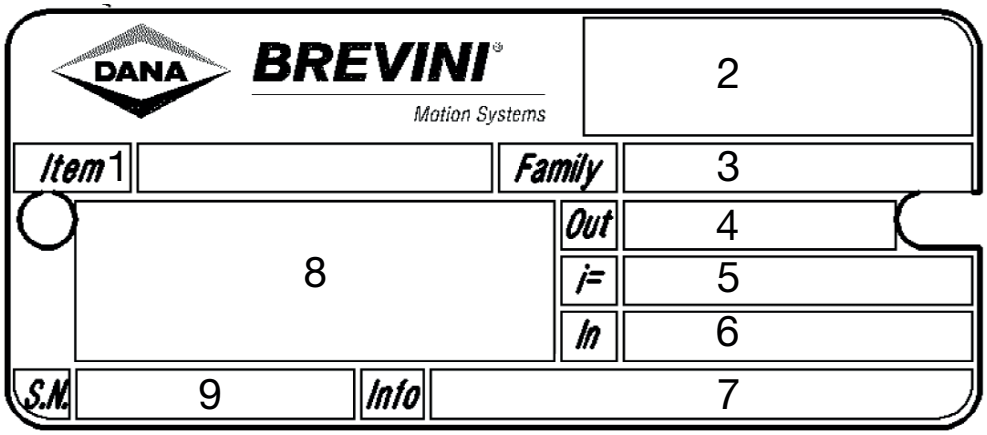
5 - Reduction ratio

6 - Gear unit input

7 - Info

8 - Bar code

9 - Serial number



CODE DESCRIPTION

PWD	3500	25	FL450.8C-RL-CW
Gearbox family	Gearbox size	Transmission ratio	Gearbox input

SUPPLY CONDITIONS

The exterior of the gearbox is painted with a synthetic epoxy primer (RAL 5010 blue), unless otherwise specified in the contract conditions. The paint coating is designed to withstand normal industrial environments, including outdoor sites; if necessary, additional synthetic top coats can be applied.

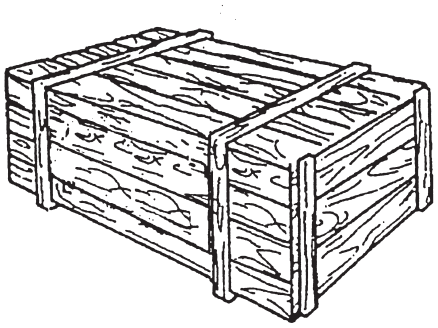
If the machine is to be used under particularly aggressive environmental conditions, a special paint coating can be applied.

The external parts of the gearbox, such as the ends of hollow and solid shafts, support surfaces, pilots etc. are protected with a rust-inhibitor oil (tectyl). Internal parts of the gearbox casings and gear trains are also protected with rust-inhibitor oil.

Unless otherwise specified by contractual conditions, all gearboxes are supplied without oil, as indicated by a sticker affixed to the gearbox to notify the user of this condition.

PACKING, HANDLING, RECEPTION, STORAGE

PACKING



⚠ CAUTION

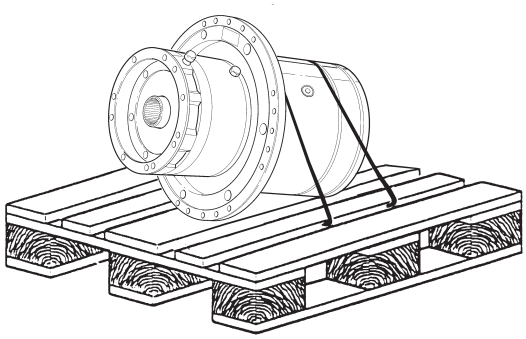
Brevini Riduttori S.p.A. products are packed and shipped in crates or on pallets.

All Dana Incorporated products, unless otherwise indicated in the contract, are supplied with packing designed to withstand normal industrial environments.

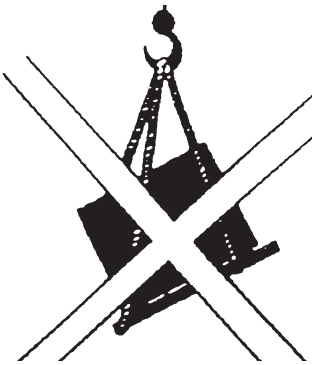
HANDLING

NOTE:

The weight shown on the nameplate must be considered net of any accessories; therefore, to calculate the overall weight of the gearbox + accessories, consider a guideline maximum additional weight of approximately 15kg.

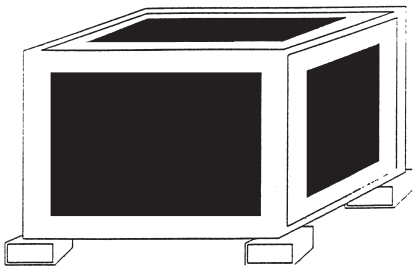


To move the packed gearbox, use lifting equipment that is suitable for the type of packing and having adequate lifting capacity, which must be indicated on the equipment, in relation to the weight of the load.



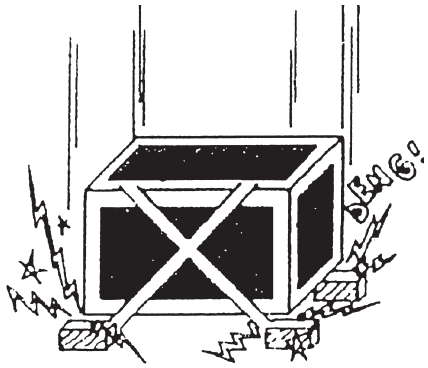
Do not tilt or turn the pack upside down while lifting or during transport.

If the packs are unloaded using a forklift truck, make sure the load is balanced on the forks.



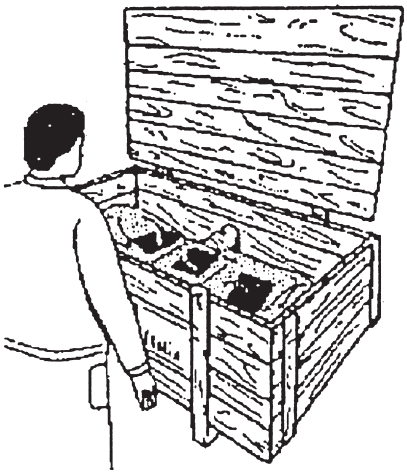
If necessary, place wooden chocks under the pack to facilitate lifting operations.

If the packs are unloaded with a hoist or, in any case, with a hook, make sure that the load is balanced and sling is using legally approved lifting accessories. For packs shipped on pallets, make sure that the lifting accessories do not damage the machine.

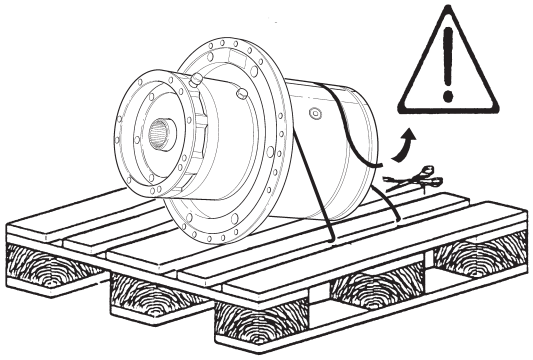


Avoid violent impacts when lifting and positioning the packed unit.

RECEPTION



When the machine is received, check that the supply corresponds to the specifications in the order. Check also that the pack and its contents have not been damaged during transport.



⚠ CAUTION

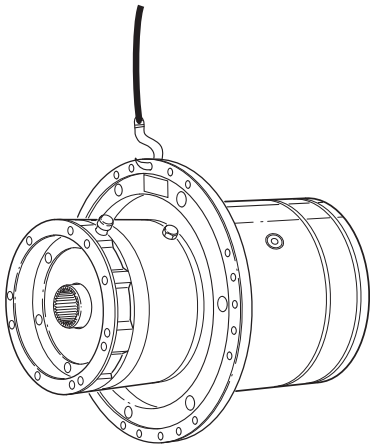
The strap securing the product to is packaging has sharp edges. Use caution: when unpacking the product, the strap may strike the operator.

To remove the packaging, proceed as follows:

- Use a pair of shears to cut the straps (beware of possible impact with the cut ends of the straps).
- Cut or slide off the external packing.
- Cut the internal strap (beware of possible impact with the cut ends of the straps).
- Remove the product from the pallet.

If the product has been damaged or shows signs of defects or missing parts, notify Dana Incorporated, immediately. Tel. +3905229281, Fax?+390522928300

HANDLING THE UNPACKED MACHINE

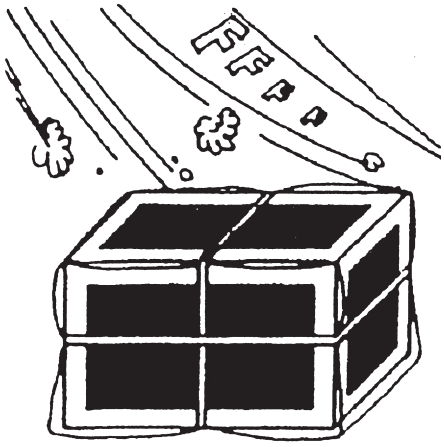


⚠ CAUTION

Before removing the machine from its packing, make sure it is securely attached to the lifting accessories so that is cannot slip or overturn.

Before handling the machine, remove the wooden blocks inserted in the packing to keep it stable during shipment.
Lift the machine making sure the load remains balanced during manoeuvres.

STORAGE

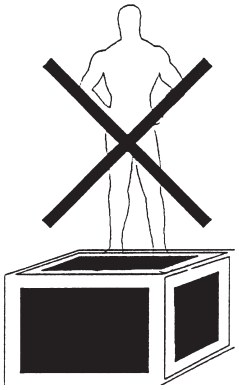


If the product must be stored for more than two months, proceed as follows:

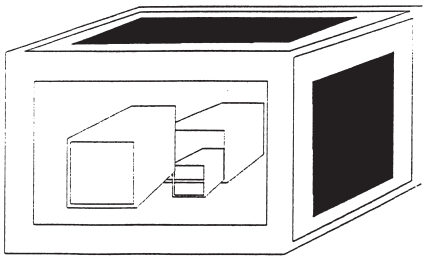
- Protect the shafts and pilots with a film of grease and/or rust-inhibitor liquids.
- Completely fill the gearbox and multi-disk brake (if present) with suitable oil (see section "Table of Lubricants p. 20").
- Store the machine in a dry place at a temperature of between - 5°C and + 30°C.
- Protect the packs from dirt, dust and moisture.

NOTE:

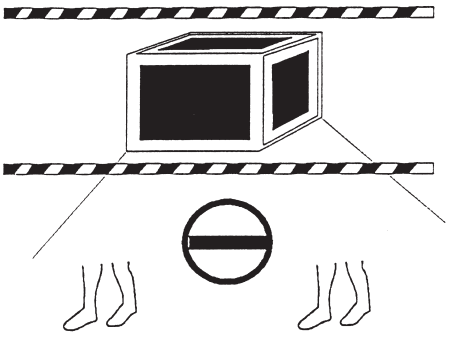
Rotating seals may lose their efficiency after extended storage of more than 6 months. We recommend checking rotating seals periodically by rotating the input shaft by hand to turn the internal gears. In the presence of a negative multi-disk brake, release the brake using a hydraulic pump or similar device (see section "First start-up checks p. 22" for brake opening pressure). It is good practice to renew seals and gaskets at the time of start-up.



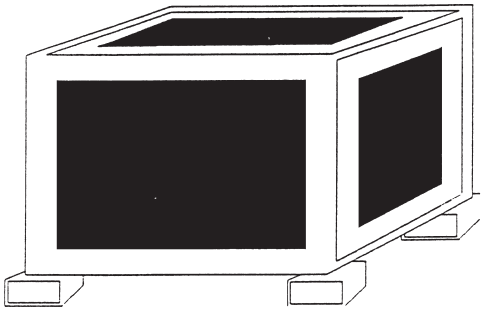
- Do not stack the parts.
- Do not walk on or place parts on top of the pack.



- Do not store any material inside the pack.



- Keep the pack away from transit areas.



- If possible, insert wooden chocks between the pack and the floor.

INSTALLATION

GENERAL REGULATIONS

Install the product carefully following the steps listed below:

- The structure in which the gearbox is to be installed must be provided with holes in correspondence with the gearbox oil plugs to accommodate the extension pipes needed for lubrication purposes.
- If the gearbox is supplied in a configuration with an external multi-disk brake, make sure that the brake filler, breather, level, and drain plugs are in the correct position and in correspondence with the lubrication chambers, depending on the type of gearbox used.
- Irrespective of whether it is external or internal, the brake must be correctly connected to its hydraulic control circuit, which must be subjected to an air bleed operation before use.
- The customer is responsible for installing suitable guards to comply with applicable safety standards in the country where the machine is used.
- For gearboxes installed outdoors, use rust-inhibitor paint, protect the oil seals with water-repellent grease, and fit appropriate weather covers.

NOTE:

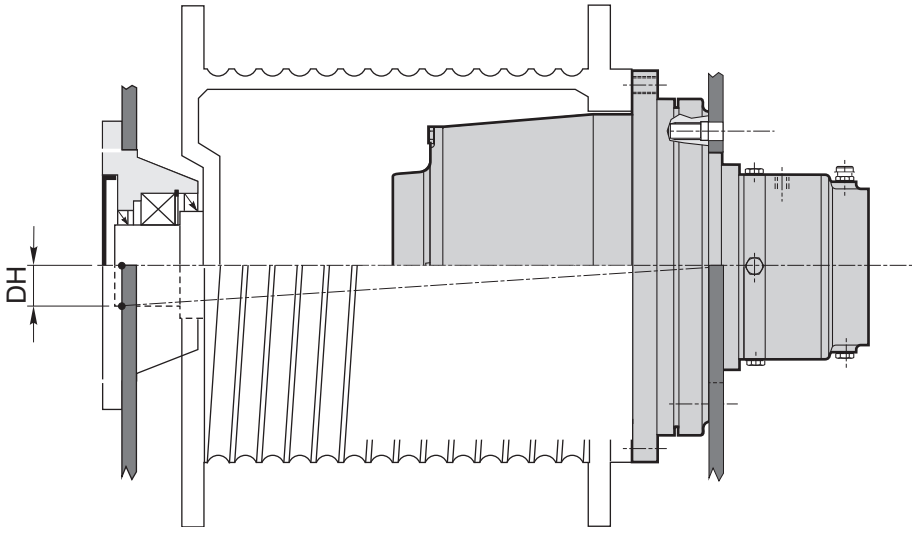
Dana Incorporated advises against filling its products with oil to the required level prior to installation.

INSTALLATION PRESCRIPTIONS

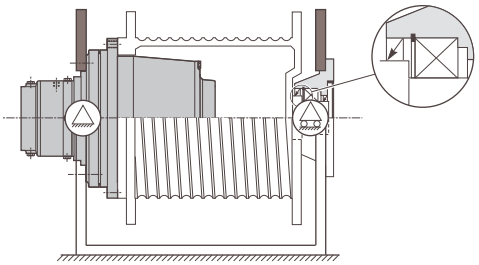
- The pilots and mating surfaces of the gearbox must be clean, degreased and undamaged.
- When installing these gearboxes, make sure that they are oriented so that the oil plugs are aligned with the access holes in the structure and the breather plug of the external brake (if present), is positioned correctly.

To position the oil plugs with ease, before securing the gearbox, check that the letter “H” on the upper part of the spindle support surface is in fact at the top.

- In certain sizes of gearbox (PWD only), in order to install the fixing screws between gearbox and drum, you will need to make use of the milled location recesses on the frame mating surface: because of the presence of interference between the exterior of the mating surface and the fixing holes, it may prove necessary to feed pressurised oil to the brake in order to release it so that you can turn the drum, thereby allowing you to fit all the drum fixing screws with ease.
- All the screws used to secure the various parts of the winch must be at least 8.8 class (recommended) and must be torqued as indicated in the “tightening torque” table, section "First start-up checks p. 22", making sure that such torque settings are compatible with the opposite side of the fastener (nuts and/or fixing structure).
- Once the winch has been installed, check that the angle of drum flexure “DH” (if present) is no greater that 0.3 mm as shown in the diagram:



- The drum support bearing located on the opposite side of the gearbox must never be immobilised in an axial direction. The bearing must be free to slide axially to avoid unacceptable overloads acting on the winch or inside the gearbox.

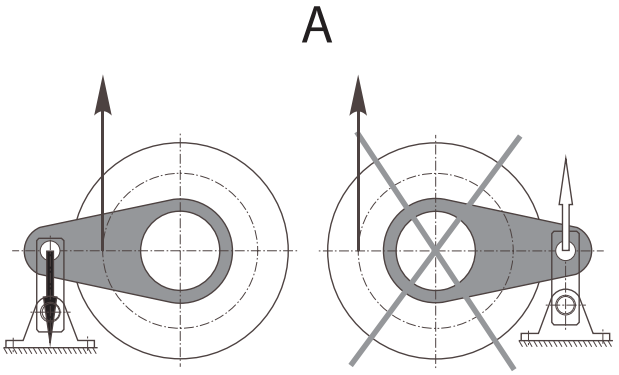
	Drum side axially blocked	
	Drum side axially free	

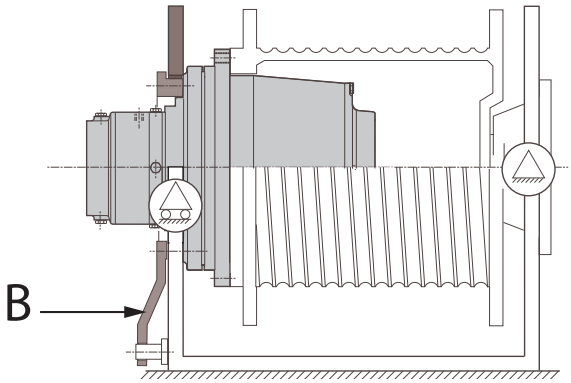
NOTE:

We recommend using class 10.9 or 12.9 screws if the application involves intensive shock loads, frequent stops, starts, and reversals, or when the value of 70% of maximum permissible torque is exceeded.

INSTALLATION PRESCRIPTIONS WITH TORQUE ARM

Ensure that the direction of deflection (line pull) is on the same side of the drum as the torque arm load cell (as shown in the diagram).





a - Line pull

b - Torque arm

INSTALLATION PRESCRIPTIONS FOR MOTOR ASSEMBLY ACCESSORIES:

When attaching the gearbox to the motor, the mating surface must be lubricated with a thin film of grease or with an anti-seizure lubricant, while the coupling itself must be greased generously. This applies to the “PWD” range only as in the “SLW - SMW” ranges the motor coupling is kept constantly lubricated with oil by the dedicated lubrication chamber.

Carefully insert the motor shaft into the coupling and make sure that the gearbox pilot engages perfectly with the motor pilot.

After checking that the motor is properly centered, tighten all the fixing screws to the torque indicated in the “tightening torque table” in section "First start-up checks p. 22".

Installation of accessories

Lubricate the splines with a thin film of grease or an anti-seizure lubricant, and tighten the fixing screws to the torque indicated in the “tightening torque” table in section "First start-up checks p. 22".

BRAKE COMMISSIONING

NEGATIVE MULTI-DISK BRAKE

- Connect the brake hydraulic circuit union to the control connection on the internal or external brake of the installed gearbox

⚠ CAUTION

the brake control connection is the one with the protective rubber plug.

- Pressurize the hydraulic circuit then bleed all the brakes: partially unscrew the brake control union and maintain pressure until only oil is expelled without any air, then re-tighten the union.

LUBRICATION

Dana Incorporated supplies its gearboxes and external multi-disk brakes without oil. The choice of lubricant must be made by the user in accordance with the recommendations in the table in section "Table of Lubricants p. 20" for the gearbox and in section "Lubrication of negative multi-disk brakes p. 19" for the external brake with backstop device.

GEARBOX LUBRICATION

Filling and level - PWD range

- Unscrew and remove the filler and breather plug located at the top of the gearbox.
- Unscrew and remove the level plug located on the centreline of the gearbox.
- The plugs are located on the front of the gearbox on the motor side. When removing them, take care to ensure that the extension pipes of the plugs are not loosened to avoid the risk of subsequent oil leakage.
- Pour oil into the gearbox through the filler hole until it flows out of the level hole, and then refit the plugs.
- Run the gearbox at low speed through several revolutions to eliminate any air pockets and then check the level again.

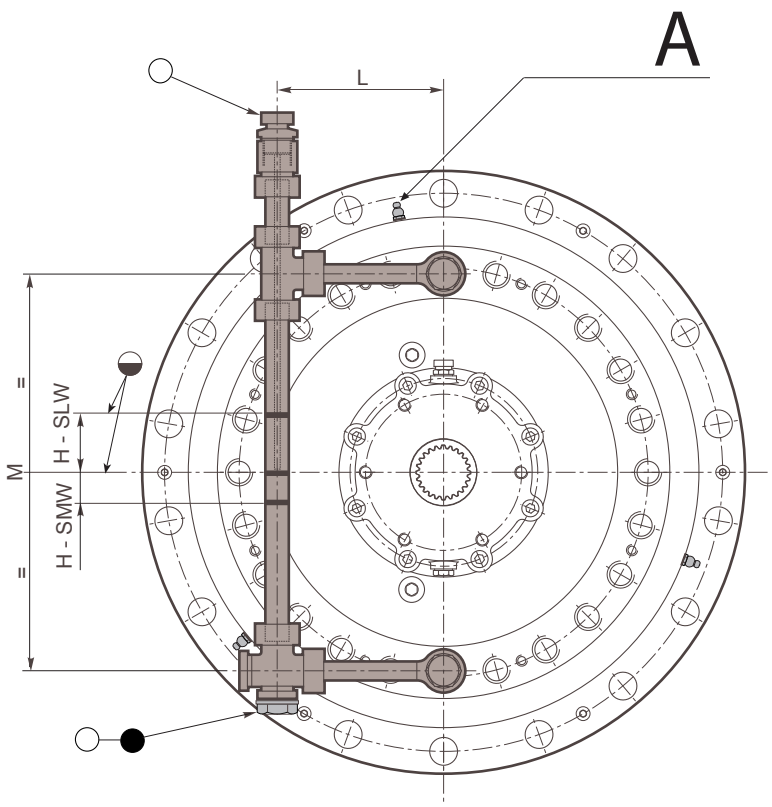
Filling and level - SLW and SMW ranges

⚠ CAUTION

"PG" oils are not suitable for use with "SLW and SMW" gearboxes.

In applications featuring Dana Incorporated SLW and SMW gearboxes, oil check and fill/drain pipes must be on the outside of the winch. We also recommend inserting a valve for to simplify oil filling and draining.

- Unscrew and remove the breather plug then connect a pipe to the valve on the gearbox drain hole using a suitable pipe union.
- Open the valve and using a pump or gravity, wait until the oil level is at the right position for the type of gearbox used.



a - Grease nipple

	H ± 5 MM.	L (MM.)	B (MM.)
SLW3003	55	185	370
SLW4003	55	185	370
SLW6003	60	215	430
SLW8503	60	230	470
SMW12004	5	325	605
SMW18004	5	325	610
SMW25004	5	400	780
SMW35004	5	400	790

- Grease the rotating oil guards with “Polymer 400” grease using the no. 3/4 grease nipples on the gearboxes (see diagram).
- Run the gearbox at low speed through several revolutions to eliminate any air pockets and then check the level again.

⚠ CAUTION

Brevini Riduttori supplies “SLW and SMW” gearboxes with the rotating oil guards already suitably greased.

LUBRICATION OF NEGATIVE MULTI-DISK BRAKES

FILLING AND LEVEL: MULTI-DISK BRAKES FOR PWD GEARBOXES

Internal multi-disk brake without backstop device

This brake does not require separate lubrication because it is connected to the interior of the gearbox and is lubricated with the same oil as the gearbox.

External multi-disk brake without backstop device

This brake does not require separate lubrication as it is lubricated with the same oil as the gearbox, therefore changed the oil in the gearbox changes oil in the brake at the same time.

External multi-disk brake with backstop device

This brake requires separate lubrication as instead of using the same oil as the gearbox, it has 2 separate lubrication chambers inside:

1 Lubrication chamber for bearings and the backstop device.

2 Lubrication chamber for brake disks.

- To lubricate external multi-disk brakes with or without backstop device, Dana Incorporated recommends using mineral oils with enhanced heat and ageing resistance and EP properties to ISO 6743-6L-CKC and ISO VG150 or SAE 80W/90 standard viscosity.
- In general, hydraulic oils are suitable for lubrication.

Filling and level: external multi-disk brake

- The lubrication chambers of multi-disk brakes are equipped with oil level, filler, drain and breather plugs.
- Unscrew and remove the filler and breather plug located at the top of the brake.
- Unscrew and remove the level plug located on the centreline of the brake.
- Pour oil into the gearbox through the filler hole until it flows out of the level hole, and then refit the plugs.
- Turn the brake a few times to eliminate any air pockets and then check the level again.

TABLE OF LUBRICANTS

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	SYNTHETIC		
	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

PROPERTIES OF GREASE

PROPERTIES OF GREASE	
Type of soap	Complex lithium
Active component:	Liquilon (PTFE)
Consistency:	NLGI 2
Base oil	Mineral oil with viscosity of 100 - 320 cST at 40°C
Additives	Corrosion or rust inhibitors
Pour point	- 28.9 max.

FIRST START-UP CHECKS

Before starting the machine, check the following:

- That all oil levels are correct.
- That the multi-disk brake (if installed) opens and closes at the right time.
- That operating pressure is sufficient to fully open the multi-disk brake to avoid overheating with consequent premature wear of disk brakes.
- In the presence of an external brake with backstop device, check that the brake drum rotates in the correct direction, following the instructions outlined below very carefully and referring to the diagram to ensure the check is carried out with precision:

1 - Standing in front of the gearbox on the input side, speed shaft (motor side)

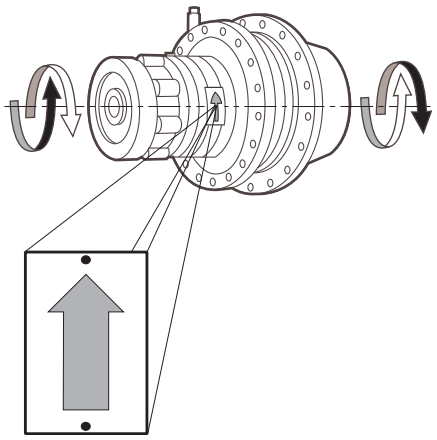
2 - Still on the input side, white arrow clockwise (OR), black arrow anticlockwise (AO).

3 - If the drum of your winch should rotate clockwise, rotation on the input side would be anticlockwise (AO) - black arrow.

NOTE:

all gearboxes have a label on the outer casing indicating the direction of rotation of the backstop device installed in the brake (see diagram).

In this instance, it is much easier to check and establish the direction of rotation of the drum driving axle.
In the diagram provided, the backstop device is disengaged and rotating anticlockwise.



⚠ CAUTION

given the type of brake, the operating pressure should never drop below the minimum brake opening pressure to avoid application of brake force.

INTERNAL	EXTERNAL	PRESSURES	
		Opening (bar)	Max (bar)
PWD2100		27	315
PWD3150		24	315
PWD3200		27	315
PWD3300		27	315
PWD3500		16	315
PWD3700		23	315
	FLs350.6C	20	315
	FLs450.8C	20	315
	FLs650.10C	20	315
	FLs650.12C	20	315
	FLs650.14C	20	315
	FLs750.10C	25	315
	FLs750.12C	25	315
	FLs750.14C	25	315
	FLs960.8C	22	315
	FLs960.10C	22	315
	FLs960.12C	22	315
	FLs960.14C	22	315
	FLs960.16C	22	315
	FLs960.18C	22	315
	FLs875.16C	22	315

Check that all screws with ISO metric threads are correctly tightened (see tightening torque table).

Tightening torque table

D X P MM	4.8	5.8	8.8	10.9	12.9
	kN	Nm	kN	Nm	kN
3x0.5	1.2	0.9	1.5	1.1	2.3
4x0.7	2.1	1.6	2.7	2	4.1
5x0.8	3.5	3.2	4.4	4	6.7
6x1	4.9	5.5	6.1	6.8	9.4
7x1	7.3	9.3	9.0	11.5	13.7
9x1.25	9.3	13.6	11.5	16.8	17.2
8x1	9.9	14.5	12.2	18	18.9
10x1.5	14.5	26.6	18	33	27
10x1.25	15.8	28	19.5	35	30
12x1.75	21.3	46	26	56	40
12x1.25	23.8	50	29	62	45
14x2	29	73	36	90	55
14x1.5	32	79	40	96	61
16x2	40	113	50	141	76
16x1.5	43	121	54	150	82
10x2.5	49	157	60	194	95
18x1.5	57	178	70	220	110
20x2.5	63	222	77	275	122
20x1.5	72	248	89	307	140
22x2.5	78	305	97	376	152
22x1.5	88	337	109	416	172
24x3	90	383	112	474	175
24x2	101	420	125	519	196
27x3	119	568	147	703	230
27x2	131	615	162	760	225
30x3.5	144	772	178	955	280
30x2	165	850	204	1060	321

d = screw diameter

p =screw pitch

kN = axial preload

Nm = torque setting

NO-LOAD TESTS

- After a brief period of operation (2-3 minutes) under no-load conditions, re-check oil levels and top-up wherever necessary. Check also that all nuts and bolts are securely tightened.
- Check that the brake, if installed, is engaged and released at the right time.
- Check that the pressure of the braking circuit opens the brake fully, avoiding overheating and premature wear of brake disks.

MAINTENANCE

Maintenance can be “routine or supplementary”.

⚠ CAUTION

All maintenance must be carried out in safety.

ROUTINE MAINTENANCE

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

- After approximately 100 hours of duty (run-in), change the gearbox oil and the brake oil in external oil bath brakes.
- Oil changes for internal brakes are unnecessary since brake and gearbox share the same oil; the oil is changed when the gearbox oil is changed.
- Oil changes should be performed when the gearbox is hot to facilitate drainage of the spent oil.
- Flush out the inside of the gearbox with a suitable liquid detergent recommended by the lubricant manufacturer.
- Subsequent oil changes should be performed every 2000-2500 hours of duty, and no less than once a year.
- Do not mix different types of oil.
- Check oil levels (about once a month) and top up as required.
- Grease rotating seals on SLW and SMW gearboxes.
- It is good practice to keep a chart for each unit, to be filled out and updated whenever maintenance is performed.

OIL CHANGE

- As already indicated in this manual, the oil change should be performed with the unit hot to reduce oil viscosity and facilitate total drainage of the original oil.
- Unscrew the breather plug (at the top) to facilitate drainage of the oil.
- Unscrew and remove the drain plug (at the bottom), taking care on PWD gearboxes not to loosen the extension pipe with resultant leakage: on SLW and SMW gearboxes on the other hand, just open the drain plug. Drain the oil out of the gearbox, replace the drain plug on PWDs or close the valve on SLW and SMWs.
- If the gearbox has a multi-disk brake with separate lubrication chambers, oil must be drained from the brake by unscrewing the drain and breather plugs to facilitate drainage of oil from the brake. Once empty, refit the drain plugs.
- Wash inside the gearbox with a suitable liquid detergent recommended by the lubricant manufacturer. If the gearbox has an external, multi-disk brake with separate lubrication chambers, wash the brake as well as explained below:

Pour the liquid into the gearbox and multi-disk brake (as applicable) through the fill holes, then replace the plugs. Turn the unit for a few minutes in both directions at high speed then drain the cleaning liquid from the gearbox and multi-disk brake (as applicable).

- See section "LUBRICATION p. 18".

SUPPLEMENTARY MAINTENANCE

Dana Incorporated prohibits users from opening the gearbox for any operations that do not form part of routine maintenance.

Dana Incorporated cannot be held responsible for any non-routine maintenance operations that result in damage to property or injury to persons.

Whenever necessary, contact your nearest Dana Incorporated service centre from the list on page "SERVICE NETWORK p. 29".

SCRAP DISPOSAL

SCRAPPING THE MACHINE

If you decide to scrap the machine, it must first be made inoperative:

- Disassemble the various parts.
- Disconnect the drive unit, as applicable.

Before performing the above steps, drain all oil out of the gearbox.

ECOLOGICAL INFORMATION

All gearbox packing materials, replaced parts, components, the gearbox itself, and all lubricants must be disposed of in accordance with environmental regulations, and without polluting the soil, water or air. Disposal is the responsibility of the user and must be performed in strict compliance with statutory legislation in the country in which the machine is used.

Waste treatment prescriptions

- 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.
- Spent oils: take all spent oils to an authorised collection and disposal point (Consorzio Obbligatorio Oli Esausti in Italy).

TROUBLESHOOTING

Consult the table below in the event of a fault.

If the problem continues, contact your nearest Dana Incorporated service centre from the list on page "SERVICE NETWORK p. 29".

PROBLEM	POSSIBLE CAUSE	SOLUTION
Oil leaking from seals	1) Seals stiffened due to prolonged storage.	1) Clean the area and check for leakage again after a few days.
	2) Damaged or worn seals.	2) Contact a Service Centre.
Multi-disk brake fails to lock	1) Residual pressure in the hydraulic circuit.	1) Check hydraulic circuit.
	2) Multi-disks worn.	2) Contact a Dana Incorporated Service Centre.
Motor running but gearbox not rotating	1) Motor not assembled correctly.	1) Check coupling between gearbox and motor.
	2) Internal malfunction	2) Contact a Dana Incorporated Service Centre.
	3) Brake locked.	3) Check hydraulic braking circuit.
Excessive heating	1) Low oil.	1) Top up oil.
	2) High thermal power values.	2) Contact a Dana Incorporated Service Centre.
	3) Multi-disk brake does not open fully.	3) Check brake opening pressure.
Multi-disk brake not disengaging	1) No pressure in brake.	1) Check brake connection.
	2) Brake seals defective.	2) Contact a Dana Incorporated Service Centre.
Excessive vibration	1) Internal malfunction	2) Contact a Dana Incorporated Service Centre.
Excessive noise	1) Internal malfunction	2) Contact a Dana Incorporated Service Centre.

CERTIFICATE OF COMPLIANCE ACCORDING TO UNI EN 10204 - 2.1

Dana Incorporated Spa declares under its own responsibility and on the basis of the results of standard tests performed on products manufactured using the same materials and the same production method, that the product specified here above complies in full with all order prescriptions and technical standards corresponding to the applicable official regulations.

THE PRODUCTION MANAGER

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