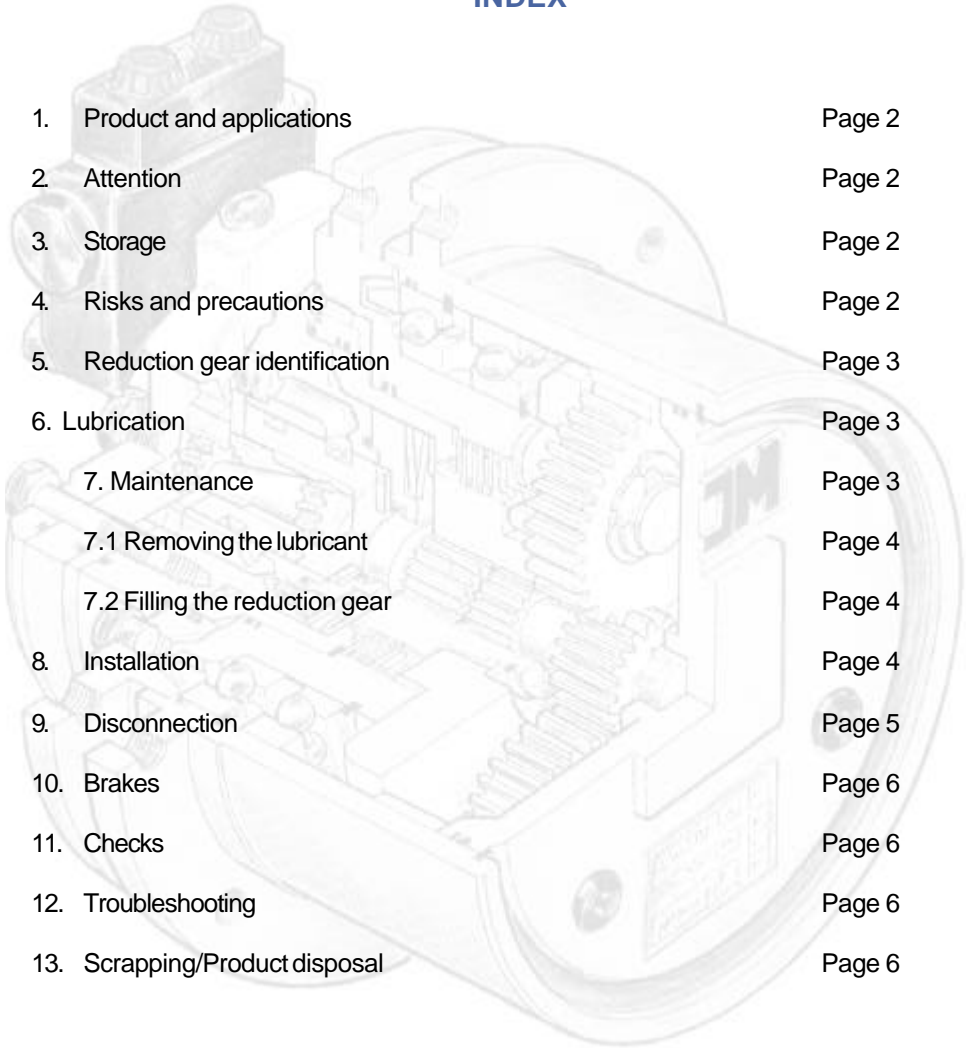


Installation and maintenance manual



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1• Product and applications

The PGR/PGW series of reduction gears are particularly suitable for the operation of self-propelled machines either on tyres (**PGW**) or tracks (**PGR**). The extreme versatility of these reduction gears is guaranteed by the different functional versions available, such as:

- single or two-stage reduction models
- integrated parking brake
- wide range of reduction ratios
- manual disengagement system for towing the vehicle
- our own made integrated axial piston or orbit motors
- set for semi-integrated commercial engines
- different mounting dimensions

2• Attention and guarantee

Read this manual through carefully before embarking on any maintenance work and prior to installing the PGR/PGW series of reduction gears.

- When the units are delivered, check the reduction gear carefully to make sure it was not damaged during transportation.
- The reduction gear is to be used in the situations and for the applications defined in the project specifications.
- Any other use is absolutely forbidden.
- Any alterations to or removal of the reduction gear components that are not authorised by Comer Industries S.p.A. can lead to damage of the reduction gear and even injure people in which case Comer Industries S.p.A. waives all liability both civil and penal.

PGR/PGW

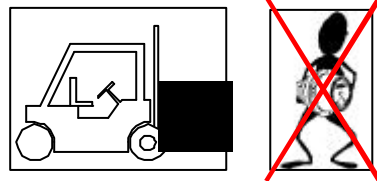
PGR/PGW

PGR/PGW

3• Storage

The reduction gears should be stored on closed, sheltered premises and raised from the ground to avoid oxidation. In addition, if the reduction gears are stored for long periods of time (longer than 3 months) they must be protected externally with an antioxidant and filled with oil to protect the internal components. The PGR/W series of reduction gears are normally supplied unvarnished and without oil. As far as concerns the reduction gears complete with hydraulic motor, whether they are the orbital or axial piston type, the motors too should be filled with oil (ISO VG46) to prevent oxidation, using metal plugs and washers to close the motor pilot and drain ports. If the holes are not sealed, dirt, water or other substances can get inside that would undermine correct operation of the reduction gear.

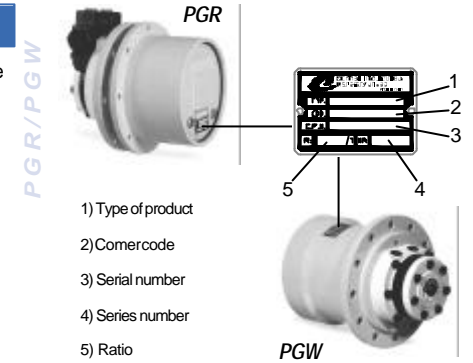
Always take the necessary measures to guarantee the safety of the people authorised to work on the reduction gear, supplying them with the necessary IPG. There is oil in the reduction gear and during maintenance some of it may leak in the working area. For this reason slip-proof shoes should be worn. When "Removing the Lubricant" use the appropriate protection gear because it is very hot and could burn. Always handle the units with adequate lifting means never manually as there is an injury hazard.



5• Reduction gear identification

All the reduction gear identification data can be found on the plate as indicated below:

The following table gives an example with the indications for identifying the product.



PGR	F	132	K	V	D	32,4	MOR	18-33	Z1AA1**	A1B1	D2	C2	E1
Reduction gear family	Brake	Size	Version	Displacement	Disconnecting system	Reduction ratio	Motor type	Motor displacement	Internal code	Pilot port	Drain port	Brake port	Displacement change port

6• Lubrication

Reduction gears of PGR/PGW series feature a splash lubrication system. Use a mineral oil with an ISO VG220 viscosity and EP additives. The following table gives the types of oil that you can buy from leading lubricant manufacturers.

AGIP	BLASIA 220
BP-MACH	ENERGOL GR-HP220
ESSO	SPARTAN EP220
MOBIL	MOBILGEAR630
SHELL	OMALA EP220
ELF	REDULTELF SP220

It is forbidden to use different types of oil unless approved by the Technical-Commercial Service Centre

7• Maintenance

The PGR/PGW series of reduction gears require routine maintenance that consists in changing the lubricant and topping it up to the correct level as described in the "Removing the Lubricant" and "Topping up the Reduction Gear" chapters.

We recommend changing the oil for the first time after 100 hours and then after 1,000 hours or at least once a year. The oil that goes to the motor should be accurately filtered.

Check the level of the lubricant regularly to safeguard correct operation of the reduction gear approximately every 100 hours of operation, topping up if and when necessary, as described in the "Topping up the Reduction Gear" chapter.

For other maintenance jobs that require removal of reduction gear parts and not specified in this chapter, contact our Technical-Commercial Service Centre.

PGR/PGW

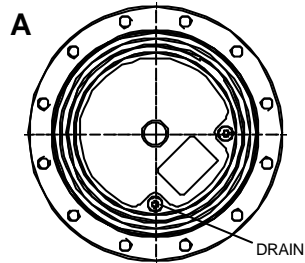


7.1 • Removing the lubricant

To remove the lubricant from inside the reduction gear, position one of the two plugs on the rear cover as illustrated in diagram A below.

Once the plug is in this position, remove both plugs to facilitate drainage of the oil.

This job should be done when the oil is still hot and very fluid.

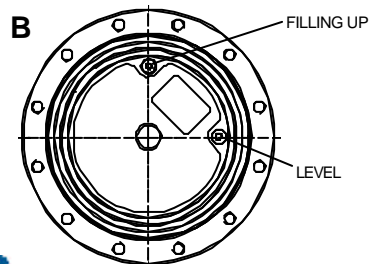


7.2 • Filling reduction gear

Before putting new oil in, wash the insides of the reduction gear with a detergent liquid recommended by the lubricant supplier.

To fill the reduction gear, position one of the two plugs on the rear cover as illustrated in diagram B below.

Once the plug is in this position, pour the lubricant in through the hole on the top until it comes out of the other hole which means the reduction gear is filled. Now put the plugs back in place on the cover.

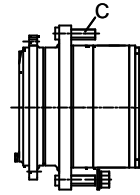


8 • Installation

Everything must be thoroughly cleaned before the machine is started.

Maximum temperature of the oil in the circuit should not exceed 80°C.

Mounting on wheel rims



When it comes to mounting the versions for machines with tyres, pay maximum attention not to damage the pin thread (C) on the rims.

Centring of the pins in their holes on the rim is all-important: make sure they do not slip out. By lifting the reduction gear you will find this easier.

Once the reduction gear is mounted on the wheel rim, tighten the pin nuts.

Mounting the hydraulic motor

To select the motor you must take into consideration the maximum performance of the reduction gear. Before mounting the motor on the reduction gear:

- clean the centrigs and the mounting faces, checking there are no dents.
- oil the centrigs and spread grease over the motor/reduction gear O ring.
- check that the motor shaft couples correctly with the reduction gear's input joint.

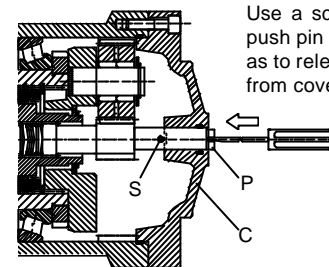
Once you have seen that the motor is positioned correctly, fix it with the screws at the tightening torque given in the table on page 7.

9 • Disconnection

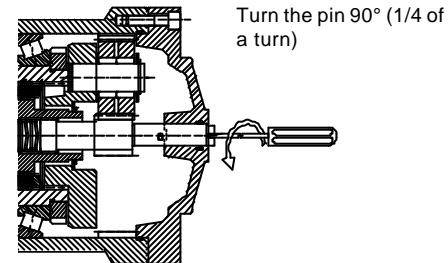
The PGR/PGW series of reduction gears can be supplied with a manually operated mechanical disconnection device, suitable for towing the vehicle.

There are two types of disconnection:

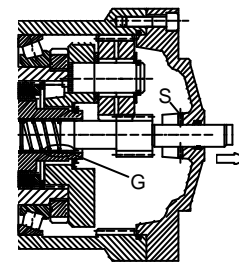
PGW type disconnection



Use a screwdriver to push pin P inward so as to release pin S from cover C.



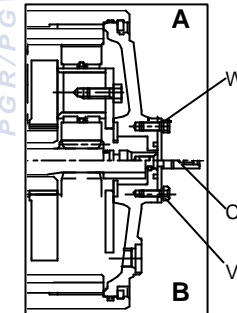
Turn the pin 90° (1/4 of a turn)



Remove the screwdriver so the spring can push the sun, disconnecting it from joint G.

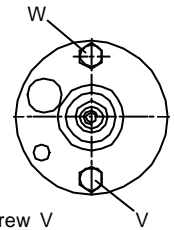
To reconnect, proceed as above but in the reverse order.

PGR type disconnection



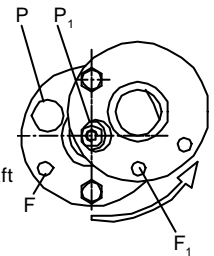
A: Connected reduction gear
B: Disconnected reduction gear

Front view of the disconnection. Working conditions with the gears engaged (A).



- Unscrew and remove screw V and loosen screw W at the top.

- Turn the cover so that the through hole P coincides with shaft C.



- Insert screw V in the threaded hole on the shaft and pull it until it projects from the cover.

- Turn the cover slightly, slipping it into the groove on shaft C; tighten screw W.

- Remove the screw from the shaft and insert it in the hole in position F1, definitively locking the shaft in the disconnected condition (B).

To reconnect, proceed as above but in the reverse order.

10• Brakes

The integrated negative brakes, a feature of the PGR/PGW series of reduction gears, are the hydraulic type with oil bath disks, suitable only for static braking, in other words, parking.

The integrated negative brake utilises the same oil as the gears hence, when changing the oil in the wheel drive, brake oil is also changed.

It is strictly forbidden to use it as a dynamic brake.

To ensure correct use of the brake, observe the values indicated in the specific documents.

If the brake fails to comply with the declared values, in the case of a malfunction or oil leak, consult our Technical-Commercial Service Centre.

Always consult our Technical-Commercial Service Centre before changing the disks or any other brake component.

11• Checks

Check that the reduction gear has been filled with oil. In the negative case, please consult the "Topping up with Lubricant" chapter.

Check that the reduction gear components are not damaged in any way and that the centring and standing parts are not rusty.

Make sure there is no air inside the hydraulic circuit.

Make sure that the reduction gear screws have been tightened to the values given in table 1 and that the plugs have all been tightened to the values given in table 2.

Check correct operation of the reduction gear, making sure that rotation direction is as wanted.

If a parking brake is installed, make sure it is working properly (engaged/disengaged).

12• Troubleshooting

Problems	Possible cause	Remedies
Oil leaks	1) The internal seals are damaged; 2) Breathing plug clogged;	1) Contact a Comer Assistance Centre; 2) Change or clean the breathing plug;
Excessive overheating	1) There is no oil; 2) Internal problem;	1) Restore correct oil level; 2) Contact a Comer Assistance Centre;
Excessive noise	Internal problem;	Contact a Comer Assistance Centre;
The negative brake fails to disconnect	1) Check the hydraulic connection; 2) Internal problem;	1) Remedy the hydraulic connection; 2) Contact a Comer Assistance Centre;
The negative brake fails to brake	Internal problem;	Contact a Comer Assistance Centre;
When pressure is sent to the motor the output shaft fail to turn	1) Motor mounted incorrectly; 2) Internal breakage;	1) Check correct motor fixing; 2) Contact a Comer Assistance Centre;
The reduction gear cannot be assembled on the mounting face	Incorrect dimensioning	Check correct fixing of the reduction gear or contact a Comer Assistance Centre;

In case of different problems from this table contact a Comer Assistance Centre.

13• Product disposal

Dismantle the machine, separating the parts following the instructions given in this manual.

You must group the parts according to the materials they are made of: iron, aluminium, copper, plastic and rubber.

The parts must be disposed of by the relative centres in full compliance with the laws in force on the matter of dismantling and demolishing industrial waste.

Waste oil: to dispose of waste oil abide by the laws for protecting the environment and the laws in force in the Country where the machine is used.

Tab. 1) Torque wrench setting (Nxm) of screw on iron or steel

dpx (mm)	4.8		6.8		8.8		10.9		12.9	
	min	max	min	max	min	max	min	max	min	max
4x0,7	1,5	1,9	2,3	2,8	3,1	3,8	4,4	5,3	5,2	6,3
5x0,8	3,0	3,7	4,5	5,5	6,0	7,3	8,5	10,3	10,2	12,4
6x1	5,2	6,3	7,8	9,5	10,4	12,7	14,7	17,8	17,6	21,4
8x1,25	12,5	15,2	18,7	22,7	25,0	30,3	35,1	42,6	42,1	51,1
10x1,5	25,0	30,3	37,4	45,5	49,9	60,6	70,2	85,2	84,2	102,3
12x1,75	42,5	51,6	63,7	77,4	85,0	103,2	119,5	145,1	143,4	174,2
14x2	67,6	82,1	101,5	123,2	135,3	164,3	190,2	231,0	228,3	277,2
16x2	102,4	124,3	153,6	186,5	204,8	248,6	287,9	349,6	345,5	419,6
18x2,5	142,7	173,3	214,1	259,9	285,4	346,6	401,4	487,4	481,7	584,9
20x2,5	200	243	300	364	400	486	562	683	675	819
22x2,5	268	326	402	489	537	652	755	916	906	1.100
24x3	346	420	518	629	691	839	972	1.180	1.166	1.416
27x3	504	612	756	918	1.008	1.224	1.418	1.721	1.701	2.066
30x3,5	688	835	1.032	1.253	1.375	1.670	1.934	2.349	2.321	2.818

dpx (mm)	4.8		6.8		8.8		10.9		12.9	
	min	max	min	max	min	max	min	max	min	max
8x1	13,1	15,9	19,7	23,9	26,2	31,8	36,9	44,8	44,2	53,7
10x1,25	26,0	31,5	38,9	47,3	51,9	63,0	73,0	88,6	87,6	106,4
12x1,25	45,3	55,0	67,9	82,4	90,5	109,9	127,3	154,6	152,8	185,5
12x1,5	43,9	53,3	65,8	79,9	87,8	106,6	123,4	149,9	148,1	179,8
14x1,5	71,4	86,7	107,1	130,0	142,8	173,4	200,8	243,8	241,0	292,6
16x1,5	107,2	130,1	160,8	195,2	214,3	260,3	301,4	366,0	361,7	439,2
18x1,5	154,9	188,0	232,3	282,1	309,7	376,1	435,6	528,9	522,7	634,7
20x1,5	215	261	322	391	430	522	604	734	725	881
22x1,5	286	347	429	521	572	695	805	977	966	1.173
24x2	367	446	551	669	734	891	1.032	1.254	1.239	1.504
27x2	531	645	797	968	1.063	1.291	1.495	1.815	1.793	2.178
30x2	739	897	1.108	1.345	1.477	1.794	2.077	2.522	2.493	3.027

Tab. 2) Torque wrench setting of plugs with a copper washer

Plug size	Plug out diam.	Plug int. diam.	Tightening torque	
			minimum	maximum
1/8" GAS	mm	mm	N.m	N.m
	14	10,5	13	16
1/4" GAS	18	13,5	28	36
3/8" GAS	22	17,2	46	59
1/2" GAS	26	21,5	65	83
3/4" GAS	32	27,0	111	141
1" GAS	40	33,0	240	306
3/8" 24UNF	14	10,0	14	18
9/16" 18UNF	19	14,5	32	41
3/4" 16UNF	25	19,5	69	88
M8x1	12	8,4	9	12
M10x1	14	10,5	13	17
M12x1,5	17	12,5	25	32
M14x1,5	19	14,5	32	41
M16x1,5	22	16,5	48	62
M18x1,5	23	18,5	50	63
M20x1,5	25	20,5	60	76
M22x1,5	27	22,5	71	90

Tab. 3) Torque wrench setting (Nxm) of screw on cast aluminium

dpx (mm)	4.8		6.8		8.8		10.9		12.9	
	min	max	min	max	min	max	min	max	min	max
4x0,7	1,5	1,9	2,3	2,8	2,7	3,1	2,7	3,1	2,7	3,1
5x0,8	3,0	3,7	4,5	5,5	5,2	6,0	5,2	6,0	5,2	6,0
6x1	5,2	6,3	7,8	9,5	8,9	10,4	8,9	10,4	8,9	10,4
8x1,25	12,5	15,2	18,7	22,7	21,4	25,0	21,4	25,0	21,4	25,0
10x1,5	25,0	30,3	37,4	45,5	42,8	49,9	42,8	49,9	42,8	49,9
12x1,75	42,5	51,6	63,7	77,4	72,8	85,0	72,8	85,0	72,8	85,0
14x2	67,6	82,1	101,5	123,2	116,0	135,3	116,0	135,3	116,0	135,3
16x2	102,4	124,3	153,6	186,5	175,5	204,8	175,5	204,8	175,5	204,8
18x2,5	142,7	173,3	214,1	259,9	244,7	285,4	244,7	285,4	244,7	285,4
20x2,5	200	243	300	364	343	400	343	400	343	400
22x2,5	268	326	402	489	460	537	460	537	460	537
24x3	346	420	518	629	592	691	592	691	592	691
27x3	504	612	756	918	864	1.008	864	1.008	864	1.008
30x3,5	688	835	1.032	1.253	1.179	1.375	1.179	1.375	1.179	1.375

dpx (mm)	4.8		6.8		8.8		10.9		12.9	
	min	max	min	max	min	max	min	max	min	max
8x1	13,1	15,9	19,7	23,9	22,5	26,2	22,5	26,2	22,5	26,2
10x1,25	26,0	31,5	38,9	47,3	44,5	51,9	44,5	51,9	44,5	51,9
12x1,25	45,3	55,0	67,9	82,4	77,6	90,5	77,6	90,5	77,6	90,5
12x1,5	43,9	53,3	65,8	79,9	75,2	87,8	75,2	87,8	75,2	87,8
14x1,5	71,4	86,7	107,1	130,0	122,4	142,8	122,4	142,8	122,4	142,8
16x1,5	107,2	130,1	160,8	195,2	183,7	214,3	183,7	214,3	183,7	214,3
18x1,5	154,9	188,0	232,3	282,1	265,5	309,7	265,5	309,7	265,5	309,7
20x1,5	215	261	322	391	368	430	368	430	368	430
22x1,5	286	347	429	521	491	572	491	572	491	572
24x2	367	446	551	669	629	734	629	734	629	734
27x2	531	645	797	968	911	1.063	911	1.063	911	1.063
30x2	739	897	1.108	1.345	1.266	1.477	1.266	1.477	1.266	1.477

Tab. 4) Coupling resistance classes for screws and nuts

When a screw is tightened with a nut, check that the coupling nut's minimum resistance class is the following:

screw class	3.6	5.6	6.8	8.8	10.9	12.9
	4.6	5.8				
minimum nut class	4.8					
	4A	4D	5S	6S		
	4	5	6	8	10	12



Maintenancesheet

Date of maintenance work

Operating hours

Comer code

Serial number

PGR/PGW

Work carried out:

PGR/PGW

PGR/PGW

