

PYK

S E R I E S

MAINTENANCE AND OPERATION INSTRUCTIONS

NRW[®]
DRIVE TECHNOLOGIES

**Feeder Mixer Drives for Horizontal and Vertical, (PYK)
GEARBOXES WITHOUT MOTORS**



Dok. No : PYK
MOI : 4 / 19



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1.1 Important Warnings

Take into consideration the listed safety warnings and information signs below!



ATTENTION !
Dangerous position and possible result
Slight and unimportant woundings



NOTE !
Advices and necessary informations for the user



DANGER !
Harmful position and possible result
Damage in gear unit and environment



DANGER OF ELECTRICITY !
Danger of electrical shock and possible result
Death and heavy woundings



DANGER !
Danger possible result
Death and heavy woundings



1.2 General Information

This user guide is prepared by our firm to provide information about safety of gearboxes as well as storage, installation/mounting, connection, operating, maintenance and repair processes. All the purchase and technical data are positioned at product catalogues. Beside engineering applications, the information which is placed in this instruction, should be well read and applied. The documents must be protected and to get ready for controlling by authorized person.

Purpose of the manual:

This manual;

- Provide information about **ordinary maintenance** for gearboxes PYK Series installed in vertical position (uscita rivolta verso l'alto),
- Must be read by the workers and authorized people / operators before any kind of intervention, in order to guarantee a positive reply and must be kept handy, in a safe place and must always be clear and legible for future reference if and whenever needed.

Ordinary maintenance:

Ordinary maintenance predicts controls and activity to carry out at regular and defined intervals. Ordinary maintenance guarantees unit long life and excellent performance.

Extraordinary maintenance:

Extraordinary maintenance is necessary;

- when the gearboxes present malfunctioning,
- after 5000 working hours.

Unit identification:

All the data which characterize the gear unit are reported on the name plate that can be seen next.

Safety:

Always take the necessary precautions to guarantee the safety of the people authorized to work on the gearbox. Individual Protective Devices must be supplied by the employer who must also inform the workers on how to use them correctly.

1.3 Correct Use

NRW gearboxes are designed to use in commercial plants and are operated convenient to the current standards and directions. Technical data and allowed usage conditions are placed in product's power tab and usage guidance. Should be conformed to all the values.

This usage guidance is prepared by our firm according to 2006/42/EC The European Union Machinery Safety Instructions and is not be in placed 2014/34/EU "The direction about tools used in possible explosive environment and protective systems".



1.4 Safety Information

In gearboxes, there could be materials subjected to voltage, movable pieces and hot areas. During all the works to be done; transportation, storage, placing, moutage, connection, operating, maintenance-repair processes could be implemented by qualified employees and responsible managers.

All the processes to be implemented during the working period;

- Related usage and maintenance instructions,
- Warning and safety tags in gearboxes,
- Instructions and Requirements related to the system,
- Local and International requirements for safety and accidental protection.
- Disassembly of the gearbox should only be made by authorized personnels.

Our Firm is not responsible where the listed items are implemented below:

- Violation of work health and safety rules in gearboxes,
- Improper use (Any use outside the limits specified in the User's Manual and outside the name label/catalog values; especially at high moment and at different speeds) and incorrect installation or use of the gearbox in operation,
- Extremely dirty and maintenance free of gearboxes,
- Unlubricated usage,
- Take out of the necessary protective plugs,
- Disuse of original pieces in gearboxes,
- The using, mounting, maintaining and taking place of the uneducated, unauthorized and unqualified 3. persons.

1.5 Responsibility

NRW declines any responsibility in case of:

- Use of the reducer not compliant with national laws on safety and accident prevention,
- Work done by unqualified personnel,
- Incorrect installation,
- Tampering with the product,
- Incorrect or failure to follow the instructions in the manual,
- Incorrect or failure to follow the indications marked on the identification labels fixed on the units,
- Incorrect connections and/or use of temperature sensors (when present),
- Use of gearbox under unlubricated conditions,
- The contents of this manual were reviewed to ensure consistency with the catalogues and etc. documents. We cannot guarantee full consistency since the changes cannot be completely prevented. However, the informations in this manual are reviewed regularly and necessary revisions are made in next editions.

The products supplied by NRW are intended to be incorporated into "complete machines", so it is prohibited to put them into service until the entire machine has not been declared compliant.

	<p>ATTENTION !</p> <p>The configurations provided in the catalogue of the unit are the only ones allowed. Do not use the product in contrast with the indications provided in it. The instructions provided in this manual do not replace but compensate the obligations of current laws concerning safety regulations.</p>
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1.6 Transportation

1.6.1 Transportation And Freightage;

- Take into consideration of the article stated on package during the product delivery.
- During the delivery, product should be controlled about possible damages in carrying period.
- The firm should be informed about possible damages.
- The damaged products should not be put into use.
- A suitable and sufficiently large sized carrier must be used, when required.
- Carrying safeties should be removed before the start of operating.
- The weights of the movable gearboxes are placed in product catalogues.
- The dangerous area should be got into the secure to prevent damage to the persons.
- During the carrying process, to stand under the gear unit could cause danger of death.
- The damage of gear unit must be prevented. The crushes to the free input shafts could damaged into the gear unit.

1.6.2 Package Transportation;

- There could be no loads on packages or the shelved surfaces should be prepared.
- The necessary carrying equipments should be prepared.
- The carrying and lifting equipments should be larged - enough to the sufficient capacity.
- The calculations should be made to the connection points and center of gravity.
- If necessary, this information should be written on the package.
- The carrying equipments (steel rope, belt, chain etc.) must be robust and suitable to the applied weight.
- During the carrying process, the load centering could be done without oscillation.

1.6.3 Equipment Transportation

- The connection carrying point should be appointed.
- The carrying equipments (hook, chain, belt) must be prepared. To the alternative, pallet must be used for the load -lifting.
- If the Crane will be used, it could be lifted perpendicular from inside to the outside of the package.
- If the forklift or palletized carrying equipment will be used, the product which removed from package should be placed on the pallet.
- The fork of the equipment should be carried out the way that gripped the pallet.
- The weight must be lifted both with slowly and constant speed and must take measure to the sudden oscillation.



ATTENTION !

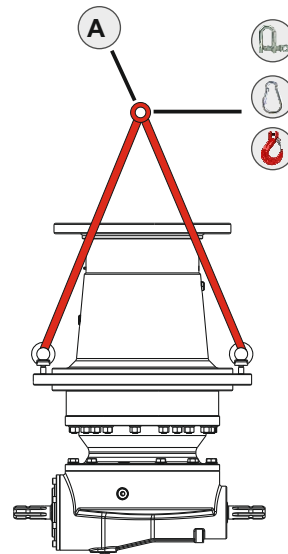
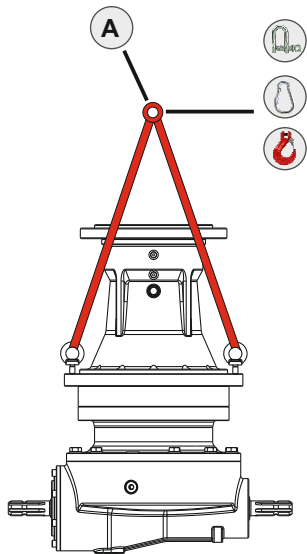
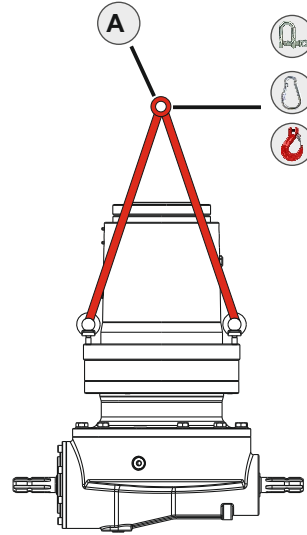
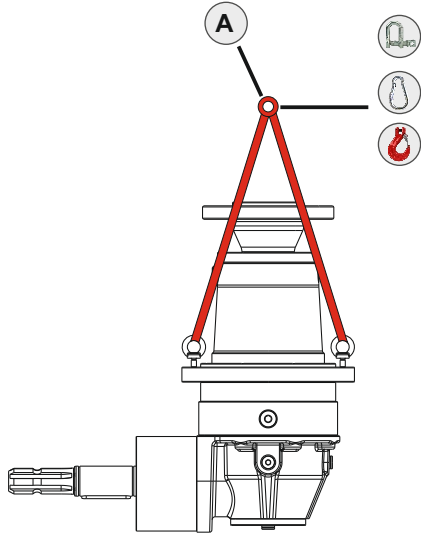
During the carrying process, the fixings like the lifting lug, hook, belt, rope, locked hook must be sufficient to the load and have conformity certificate. The weights of the movable gear unit/gear unit with motor have given in product catalogue.




NOTE !


In all carrying processes, there should be avoided from both sudden movements and sudden liftings.


PYK
VERTICAL



A Hoop equipped (swab)

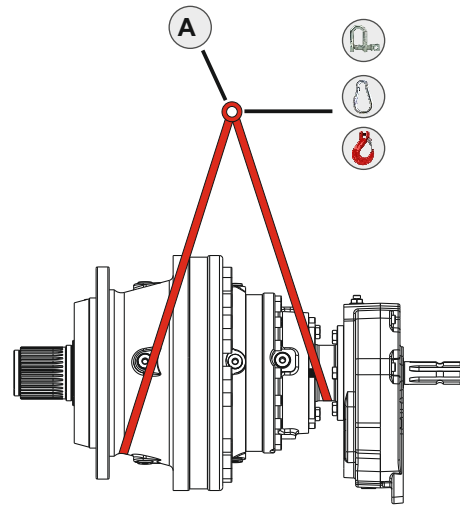
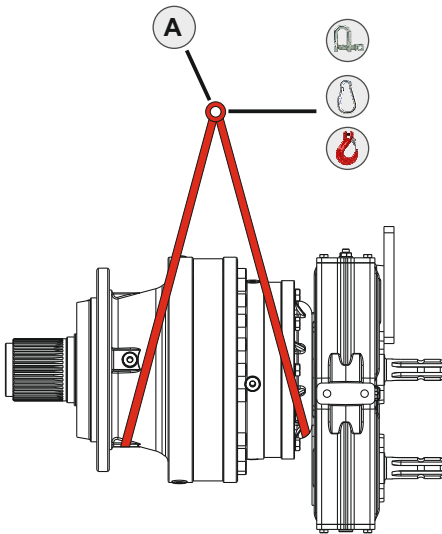
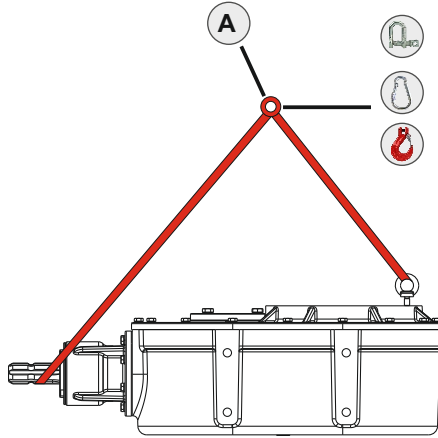
 Load hook

 Screw hook


 Locked hook


Manuel lifting (Weight ≤ 15 kg)(ref. ILO Contract)
Not: valid for the continuous carrying.


PYK HORIZONTAL



A Hoop equipped (swab)

 Load hook

 Screw hook

 Locked hook

Manuel lifting (Weight ≤ 15 kg)(ref. ILO Contract)
Not: valid for the continuous carrying.



1.7 Storage

The certain suggestions have given about storage conditions of the gearboxes below.

- In clear and moist-airs, the storage should not be made.
- The gearboxes should not be directly contacted to the ground.
- The place must be moveless where the gearboxes are contacted. Otherwise there could be damage during the movement.
- The gear unit should be got into the secure to the falling.
- The processed surfaces of the gear units and both solid and hollow shafts must be lubricated with protective oil.
- Gearboxes must be in place where there will be no big temperature differences between 0 and 40.
- Relative humidity must be less than %60.
- Not directly be exposed to sunlight and infrared light.
- Must be kept away from the abrasive materials which causes corrosion (dirty weather, ozon, gases, solvents, acids, salts, radioactivity, etc.) in environment.
- The protective oil SHELL ENSIS or similar product should be used on the corrodible pieces.
- If the gear unit is without oil, it must be filled with lubrication oil.

1.7.1 Long Term Storage Suggestions;

	NOTE !
	<ul style="list-style-type: none"> - In the long-term storage or during the short-term storage, if the excessive temperature differences occur, the oil in the gear unit must be changed before the operating. - In the fully oil filled gear unit, the oil level should be reduced according to the mounting position.
	ATTENTION !
	<ul style="list-style-type: none"> - The incorrect and excessive long storage could cause the gearbox getting defected. - Please control not to exceed allowed storage period before starting up the gearbox.
	NOTE !
	<ul style="list-style-type: none"> - NRW, recommends long-term storage option for periods of more than 9 months holding and pausing times. - By paying attention both to the long-term storage option and precautions which listed below, the holding of goods up to 2 years could be possible. Because of real efficiency of gearboxes depending on local conditions widely, these periods could be seen solely guide values.

Long Term Storage Suggestions;




- Mineral oil or synthetic oil according to mounting position is filled of getting available for operating. Despite this, the oil level should be controlled before operating.
- The VCI Corrosion protected tool are mixed into the gear unit's oil.
- The carrying safety of the ventilation plug must not be removed during the storage.
- The gear unit must be closed to the shape of unleaked.



2. PRODUCT DESCRIPTION

2.1 Gear Unit Label

Important technical informations are found on gearbox's label.

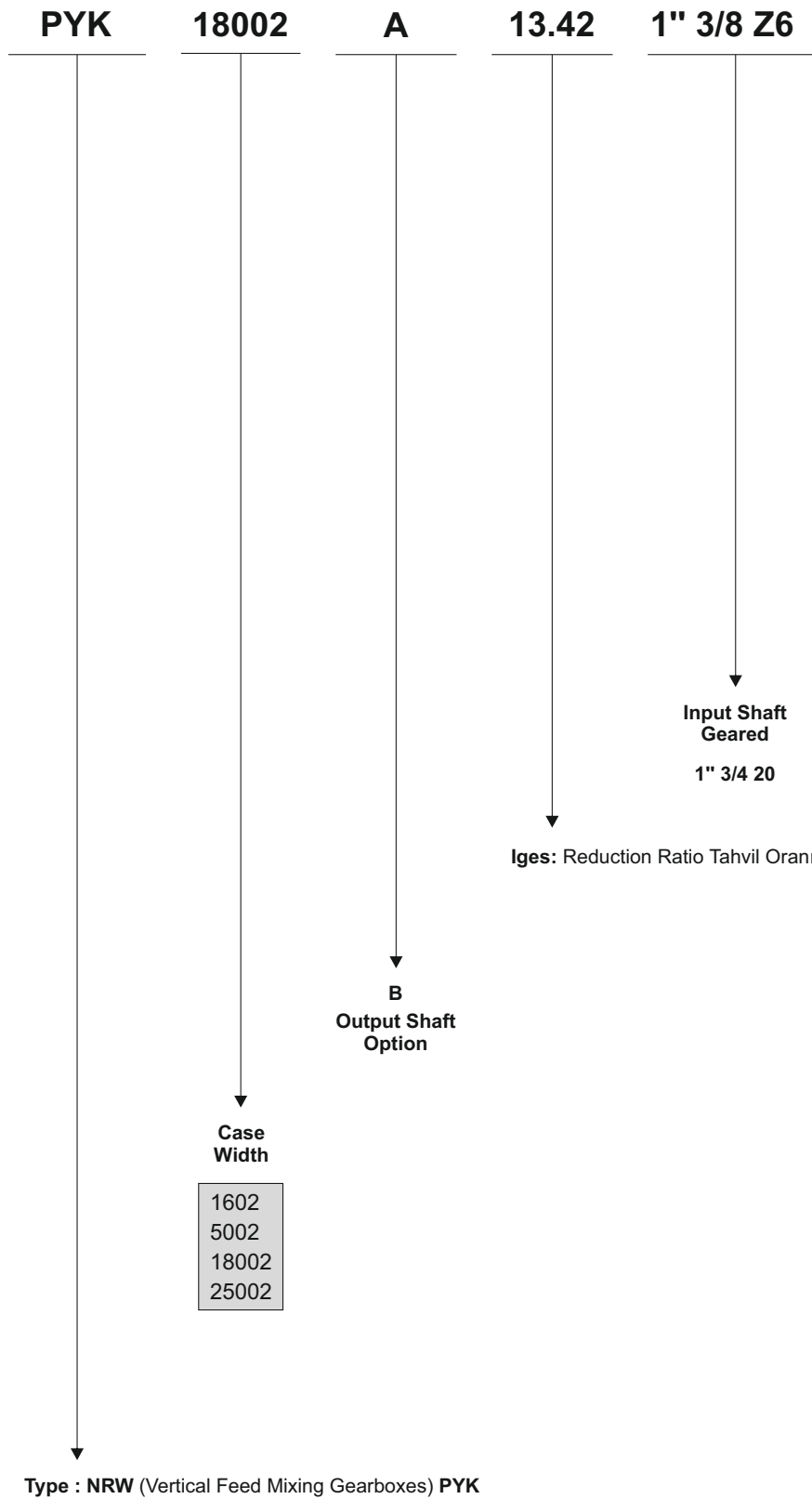
		Tel : 0256 231 19 12 (pbx)	
		Fax : 0256 231 19 17	
		www.nrwdrivetechologies.com	
Type :	①		
			②
Serial Number :	③		
M ₂ :	④	Nm i :	⑤
P ₁ :	⑥	kW n ₂ :	⑦ min ⁻¹
f _B :	⑧	⚠ ⑨	kg
 ⑩			

- ① Type
- ② Mounting position
- ③ Serial number
- ④ Output torque (Nm)
- ⑤ Reduction ratio
- ⑥ Rated power of motor [kW]
- ⑦ Output speed [d/dk]
- ⑧ Service factor
- ⑨ Weight of the geared motor (kg)
- ⑩ Used oil kind and amount (Lt)



2.2 Explanations

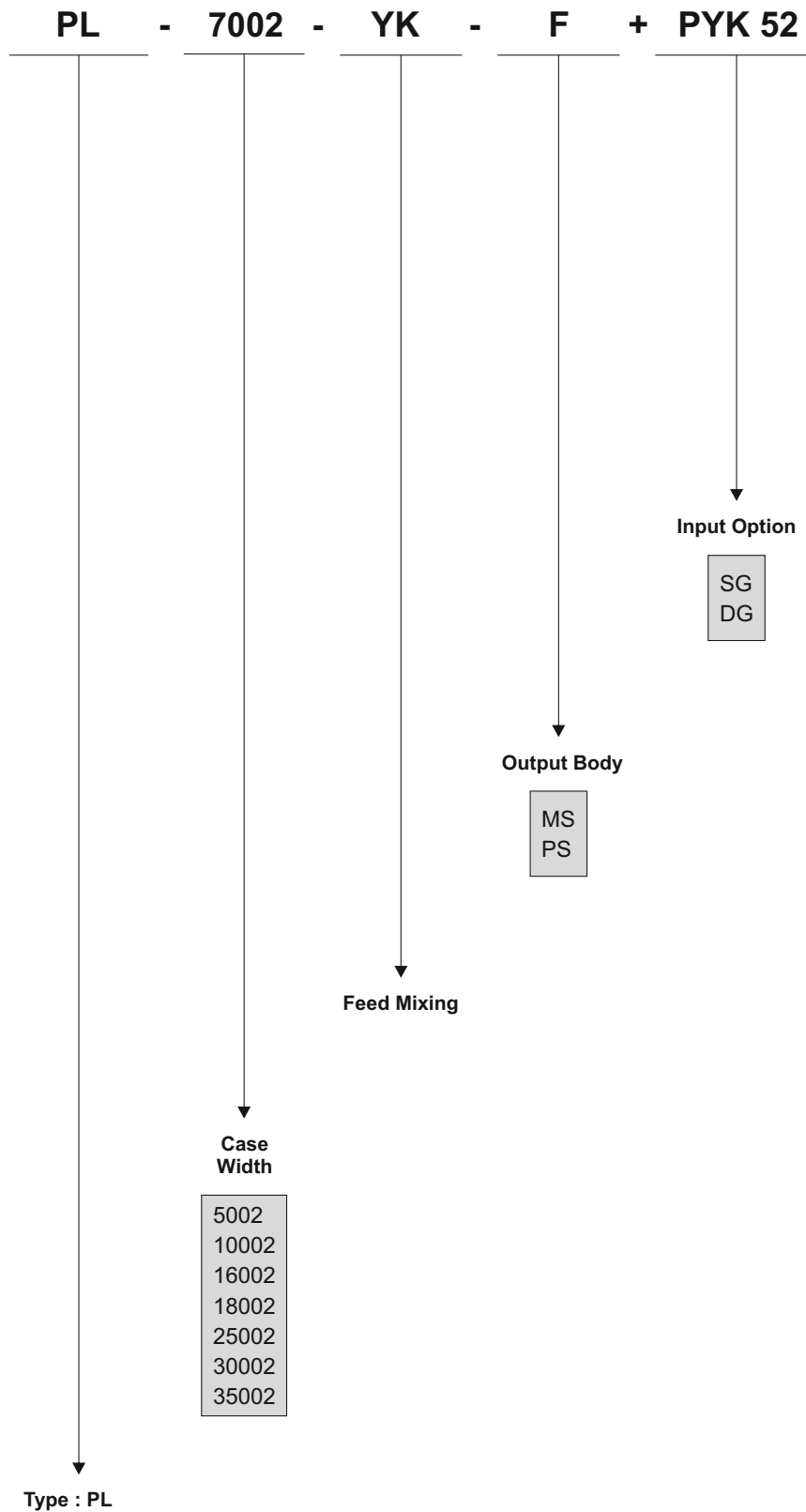
PYK (Vertical Feed Mixing Gearboxes)





2. PRODUCT DESCRIPTION

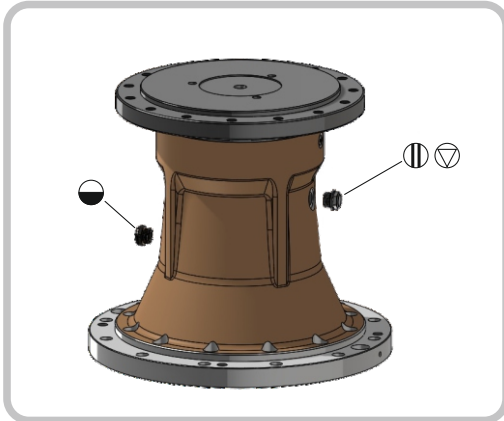
PYK (Horizontal Feed Mixing Gearboxes)





3.1 Prerequisites Of Assembly




3.1.1 Changing The Oil

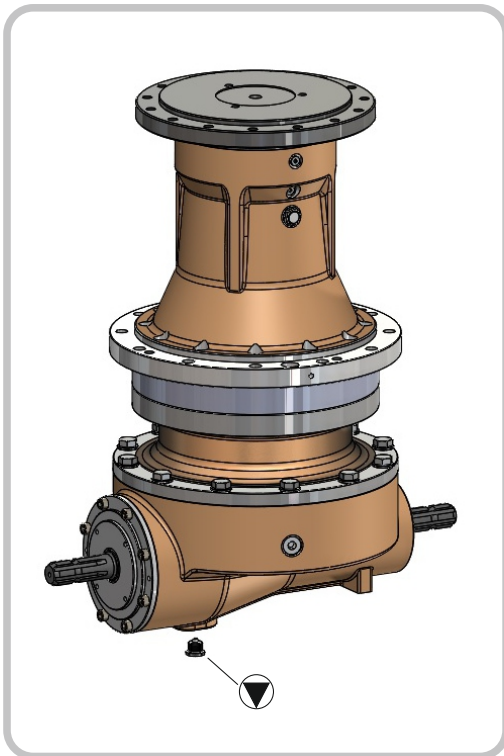


01 - BEFORE STARTING


Verify correct configuration on the specific drawings and documentations.

Remove the plug installed on the output unit:

-  Oil level plug
-  Vent plug
-  Filling plug



02 - EMPTYING

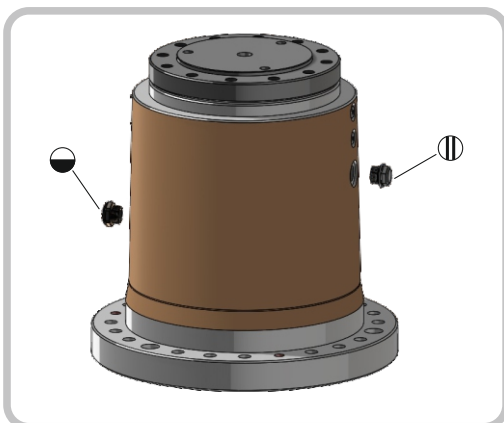
-  Remove magnetic/drain plug.

Collect oil in adequate container.
Restore and tighten magnetic/drain plug with relative washer.

03 - FILLING

Filling with new oil in compliance with specific technical documentations.

Alternatively: topping up until oil flow out from level plug holes and respect correct oil level.



04 - AFTER FILLING

Restore all plugs, elbows, extensions, etc.

Verify correct oil level after the first 50 hours of functioning and topping up with oil if necessary.



3.1.2 Grease Lubrication Filling

Remove two plugs.

Pump new grease from one plug hole (TA1 or TÛ1).

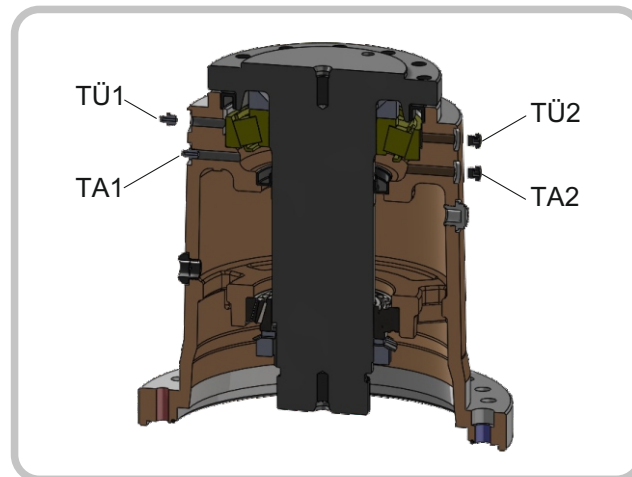
Stop to pump when grease flow out from the other plug hole.

Restore all the plugs (with their washers) previously removed and tightening.



ATTENTION !

- Grease topping up must be done during ordinary maintenance operation.
- Topping up with the same type of grease already used inside the grease chamber.



Remove one lower plugs (TA1) and one upper plug (TÛ1 or TÛ2).

Pump new grease from lower plug hole (TA1).

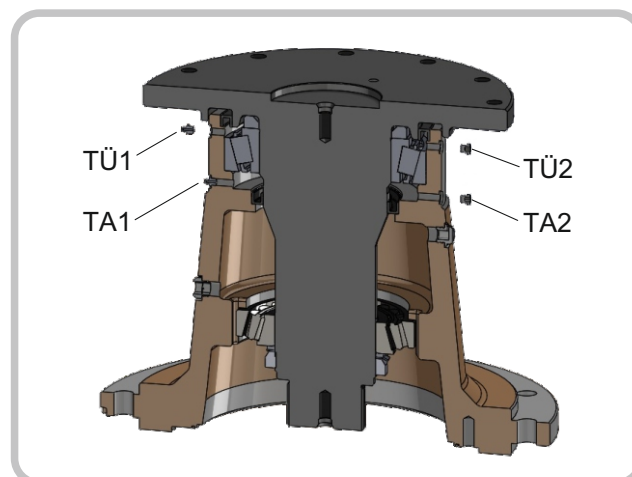
Stop to pump when grease flow out from the upper plug hole (TÛ1 or TÛ2).

Restore all the plugs (with their washers) previously removed and tightening.



ATTENTION !

- Grease topping up must be done during ordinary maintenance operation.
- Topping up with the same type of grease already used inside the grease chamber.





Prerequisites Of Assembly

Take into the consideration which listed below;

- There could be no damage in the gear unit.
At standard gear units;
- The ambient temperature should be fitted temperature values given in the 'Lubricant' part.

	DANGER !
	<p>The Gear unit must not be mounted in the ambient conditions listed below:</p> <ul style="list-style-type: none"> - Explosive atmosphere, high corrosive and/or oils, acids, gases, steams, radiation, - Places directly contacted to the food.

At special applications the configuration of gearboxes are realized convenient to the ambient conditions. Output shafts, processed surfaces, corrosion preventive material on the solid shaft/hallow shaft, jerks etc. must be cleaned.

Extensive usage-solvent must be used. The solvent should not be contacted to the bearing houses and sealing components.

In the abrasive ambient conditions, both output shaft, sealing components must be protected to the wearing Connection flanges must be attached to the hollow shaft/solid shaft according to DIN 332.

Around the mounting position, there must be sured that there are not any materials fused to metal, lubricating tool or elastomers which causes corrosion or will not be emerged.

3.2 Gear Unit Mounting

The lifting eyebolts screwed to gear unit must be used in gear unit mounting.

- Mounting of gearboxes to the machine and selection of mounting place are crucial.
- The convenient connection points must be determined for gear unit type. (Flange mounted)
- Ventilation plug must be opened after the carrying process.
- The connection tools which attached during the mounting to the machine must be tightened convenient to the torc given at the table.
- Because of the voltage, for to avoid transferring additional forces to the gear unit, both the gear unit and driven machine shaft must be aligned.
- There should not be any welding process on the gear unit. In the welding processes, the gear unit must not be used as a bracket. Otherwise bearing and gear part could damaged.
- The gearboxes only could be mounted according to determined mounting position. After the delivery, in the case of changing mounting position the change of lubrication level and other precautions could be needed.
Any failures to comply to the determined mounting position could damaged gear unit.
Please consult to NRW.
- Gearbox should be constructed to endure against operating voltage. The surface which gearbox is going to be fixed could be smooth, vibrationless and should be protected against torsion.
- The machine which gearboxes will be connected, must be sured that it is closed and not to be operated without intention.
- The sphere of the movable pieces out of the gear unit must be closed with the safety cabinet kit.
- During the gearbox mounting to the machines in the external environment, it should be prevented from being affected by weather conditions and direct sunshine. Besides, air circulation should be provided to the unit.
- Depending on the type of used gearbox, all the flange bolts must be used completely. Bolts must be tightened with proper tightening moments.

	DANGER !
	<p>In the one-way locked gear units, the gear unit must be operated at the direction of lock rotation, otherwise the damage could be occured.</p>



The proper oil filling should be controlled according to mounting position. (Could be viewed on 'lubricators/oil filling quantities' part or the values written on gear unit) The slight deviations in oil level plug are resulted because of the mounting position and within the production tolerances.

If there is any danger of the electro-chemical corrosion between gear unit and machine, plastic pieces (2-3 mm) must be mounted between the connections. The electrical discharge resistance of used plastic material must be <10 Ω.

Electro-chemical corrosion could be occurred between the different metals like cast iron and stainless steel. Also plastic washer should be used in bolts!

3.2.1 Bolt Tightening Torque Value

Bolt Tightening Moments [Nm]						
Dimensions	Bolt Quality			Cover Bolts	Coupling Bolts	Protective Cover Connection Bolts
	8.8	10.9	12.9			
M4	3.2	5	6	-	-	-
M5	6.4	9	11	-	2	-
M6	11	16	19	-	-	6.4
M8	27	39	46	11	10	11
M10	53	78	91	11	17	27
M12	92	135	155	27	40	53
M16	230	335	390	35	-	92
M20	460	660	770	-	-	230
M24	790	1150	1300	80	-	460
M30	1600	2250	2650	170	-	-
M36	2780	3910	4710	-	-	1600
M42	4470	6290	7540	-	-	-
M48	6140	8640	16610	-	-	-
M56	9840	13850	24130	-	-	-
G½	-	-	-	75	-	-
G¾	-	-	-	110	-	-
G1	-	-	-	190	-	-
G1¼	-	-	-	240	-	-
G1½	-	-	-	300	-	-



3.3 Before Operating Gearbox:

- Verify correct oil level.
- Topping up the unit and restore correct oil level if necessary.
- Carry out a general inspection of the unit.
- Verify that the gearboxes can functioning safety.

3.3.1 Gear Unit Operating

- The gear unit is tested firstly at our firm. (leakproofing test, noise test, torc test)
- For the confirmation of direction of rotation of gear unit, it is needed to be operated before machine mounting.
- The mounting of gear unit to the machine is needed to be convenient to 2006/42/EC and other safety standards.
- The mounting position of the gear unit should be as same as tag values.
- The datas in power units should be tolerated (plus, minus) %10 according to values specified in tag.
- There must not be any oil leakage in gear unit.
- There must not be extremely vibration and must not exceed acceptable voice decibel for gear units.
- In the situation of long-term non-usage, the storage conditions are needed to be implemented.
- The oil position must be controlled for the mounting position specified in catalogue.
- The oil level must be controlled.
- Before the operating, the carrying safety of the ventilation plug on the gear unit is needed to be removed.
- If the gear unit is dispatched without oil, the first oil filling must be loaded according to oil quantity stated in oil tables.

3.3.2 After Operating Gearbox:

- Verify correct functioning.
- Verify that technical data of functioning are respected.
- Verify that there are no obstacles or impediments that can influence the correct operation of the units.

	<p>NOTE !</p> <p>In case of malfunctioning, interrupt and disabled the functioning of the machine and restore safety condition of functioning.</p>
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4.1 Control And Periodic Maintenance

4.1.1 Usual Maintenance

Before starting to operate on gearbox:


- The system functioning must be interrupted.
- Verify that there are no hazardous atmosphere in the work area.


During maintenance operations:

- Self-starting of the unit must be avoided.

After maintenance operations:

- Verify that the gearboxes respect technical specification requested,
- Restore safety system functioning.
- Carry out functional tests to guarantee correct functioning.

	NOTE !
	The maintenance and periodic maintenance works are performed by qualified person/operator who is well-educated and is sufficient in electric and mechanic issues; the rules convenient to job health and safety and specific environmental problems are performed as protected.


	DANGER !
	Before the start of the maintenance work of the gear unit, gear unit should be closed at first (get into the voltage-free position), be sured service-free, needed to take measures against any accident or spinning items with the help of unexpected external load. Also all environmental safety precautions must be taken.

- Before the maintenance process, all safety equipments are needed to get ready and if necessary the outside personal should be warned. The border around the unit must be specified and must prevented equipment entrance to the area. If any failures to comply to these conditions, the situations which causes harm to health and safety could be occurred.
- Worn items only must be changed with original and unused items.
- The lubricators ,which recommended by our company, should be used. (see. 5.2 **Lubricant Table**, page 22)
- The leakproofing items on the gear unit must be changed with original items.
- If the bearing is needed to be changed please contact to our firm.
- After the maintenance work, we recommend to change the lubrication oil.

All above informations were given for the purpose of efficient and confidential operating of gearboxes.

Our firm is not responsible for substitute product and unroutined maintenance that causes damages and woundings.

When purchasing gear unit, should be noted that it is original product and has technical informations written in catalogue.

	NOTE !
	The polluted oil and rusted items must not be left to the environment after the maintenance. These items must be disposed convenient to the regulations.



4.1.2 Control and Periodic Maintenance Chart

Control and Periodic Maintenance Ranges	Control and Periodic Maintenance Works
Once at every 3000 work hours or once at every 6-months until the	<ul style="list-style-type: none"> - Visual inspection - Check for running noises - Check oil level
80 work heat. Once at every 10.000 work hours or once at least in two years (the synthetic oil is once at every 20.000 work hours or once at every four years)	<ul style="list-style-type: none"> - Change the oil - The change of the ventilation plug
At least every 10 years	<ul style="list-style-type: none"> - General overhaul.

4.2 Visual Inspection

Controlling whether there is any oil leakage exists or not should be made at gearbox. There must be controlled that if there is oil filled or not in gear unit. Should be controlled that if there is any damage in gear unit's items and whether if the connection spots are rusted. Also must be controlled that if any cracks could emerge in hose connection lines and in rubber wedges. Leakproofing likes of dripping of gear unit's oil or dripping of cooling water and in damages and cracks, repair of the gear unit must be provided. Like these situations please get in contact with NRW.

Because of the storage and carrying, before the operation of gear unit and during at first operation, low amount of grease could flow out from bearing, this type of oil leak could not create any technical failure, the safety of gear unit and bearing operation could not be effected.

	NOTE !
Because of the coldness of oil will affected the flowing and venting, the gear unit must not be cooled fully.	

4.3 Check for Running Noises

The emerge of unusual operation voice or vibrations in gear units could mean damages. In this type of situations, the gear unit must be stopped and overall revision must be made.



4.4 Control of the Lubricant and Lubricant Level

- Regular oil level controlling must be made.
- For preventing incorrectly reactivation of system, it should be secured.
- Must be waited until the gear unit got cooled.
- If the mounting position is changed, the section of "the mounting of gear unit" must be got into attention.
- A little amount of oil must be taken out of the oil drain plug. The quality of oil must be controlled.
- The oil must be changed when the sign of extremely oil pollution is seen.



4.5 Changing the Oil

To prevent the emergence of the danger of burning, must be waited until the gear unit got cooled. The oil level, draining and position of ventilation plugs are dependent on mounting position. For the mounting position, related pages from catalogue could be seen. When the oil-changing process, the gear unit should be at operating temperature. Connection of driving unit must be cut and be secured for incorrectly reactivation.

	NOTE ! Because of the coldness of oil will affected the flowing and venting, the gear unit must not be cooled fully.
	NOTE ! Below articles should be made respectively in the oil changing of hydraulic brakes. The reason is; oils of hydraulic brakes are different from gearboxes's one.

Changing the Oil;

- Oil level plug, oil draining plug and ventilation plug must be removed.
- Both the oil is completely drained and the cleaning of gear unit must be made with proper solvent.
- The leakproofing elements on gear unit must be changed with original items.
- The oil draining plug must be put back to it's own place again.
- If the oil draining and level plug's gear part are damaged, instead of these, the new plug must be used.
- Before putting on the plugs, the sticky must be applied to the gear part like Loctite 242. If the aluminum washer is damaged, the new one must be used.
- The aluminum washer must be put lower and oil draining bolt must be bolted with proper moment.
- The oil according to mounting position must be filled from the vent hole with the proper draining device to the amount which is shown in catalogue. (could be filled from hole which is on the oil level). If the oil type is changed. Must be consulted to our firm.
- After the filling process, all plugs should be closed.
- 30 minutes after the oil filling, oil level must be controlled.

At high temperatures or at hard working conditions (high humidity, corrosive environment or high temperature fluctuations), the oil changing ranges must be reduced by half.


Oil lubricant replacement operation;

- Drain the gearboxes from internal oil lubricant.
- Filling with new oil lubricant until correct oil level is reached. Correct oil lubricant type and quantity are indicated in the specific drawings and technical documentation. **When new oil lubricant is not specified, new oil lubricant must have;**
- Equivalent characteristic of oil lubricant already used in the gearboxes,
- Compatible characteristic with oil lubricant

When the new oil lubricant have different characteristic from oil lubricant previously used in the gearboxes, the unit should be flushed through with a liquid detergent recommended by the lubricant supplier.

Lubricant Topping Up;

Topping up is necessary when oil level lubricant is lower than min. as indicated in the specific drawings or documents.

	ATTENTION ! If the quantity of oil for topping up is greater than 10% of the oil capacity: check again for leaks
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4.6 Oil Plugs Squeezing Torc Chart

Plug	Torque [Nm]
1/4"	7
3/8"	7
1/2"	12

4.7 Change Of The Ventilation Plug

In excessive pollution situations, ventilation plug must be dismantled and got cleaned or with aluminum washer, the new ventilation plug must be mounted.

4.8 Change of the Oil Seal And Oil Cover

- Connection of driving unit must be cut and be secured for incorrectly reactivation.
- At the time oil seal is changing, the sufficient amount of grease must be found between leakproofing lips and should be paid attention that the surface is not dirty and dusty.
- When the double seal is used, 3/2 of the part which remained between two seal must be filled with grease convenient to the oil type inside the gear unit.
- During the change of the oil seal the proper devices must be used for not to harm the body and shaft.
- During the change of the oil seal and oil filler cup, the original product must be used.

4.9 The Bearing Greases

- To the bearings of gearboxes, the greases must be use which were given by our company at the chart.
- Our company (NRW) recommends also replacing of grease while changing lubricant at the greased bearings.

4.10 General Overhaul

The gear unit must fully be dismantled and works written below have to be done respectively.

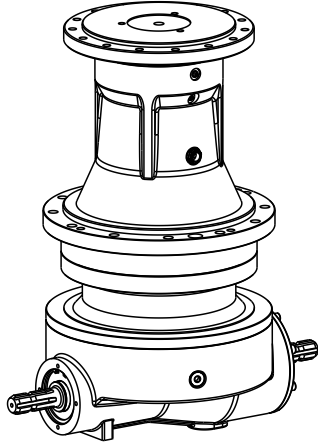
- All parts of the gear unit must be cleaned.
- The damage control must be done to all parts of the gear unit.
- The damaged parts must be changed with orginal part.
- All roller bearings must be changed.
- If there are, locks must be changed.
- All oil seals and nilos caps must be changed.

	<p>NOTE !</p> <p>The general revision should be made by the qualified personnel with considering the international laws and regulations in the plants which has the required equipments. We recommend that the general revision has to be made at the NRW service.</p>
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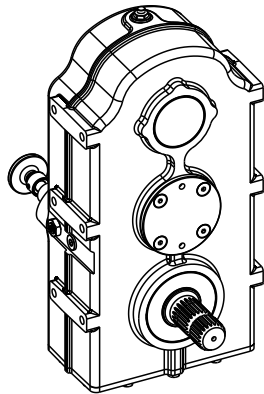


4.11 Spare Part List

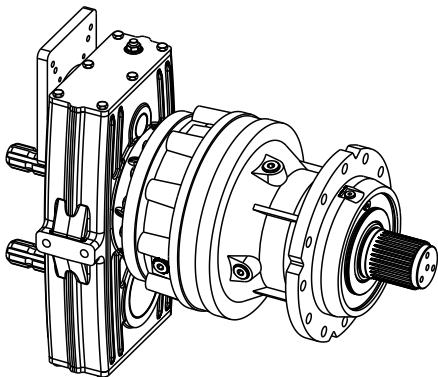
For spare part list that belongs to PYK; please get in contact with our company (**NRW**).



VERTICAL



GEARSHIFT



HORIZONTAL



5.1 Lubricant

Gearboxes PYK series are normally supplied with:

- Lubrication with oil lubricant of the internal components,
- Lubrication with grease of the upper bearing of the unit.

During the operating, the exterior surface temperature must not be over 90. If the temperature exceeds this, must be contacted with NRW technical service.

For ensuring the smooth running of the gear unit, the correct lubricating is essential; therefore at the mounting stage the following situations must be controlled:

- In compliance with the mounting position stated at order, must be controlled that whether the plugs are inserted correctly in pursuant of given informations.
- If the gear unit is mounted horizontal, must be filled at half, regardless of it's linear or angular position. With dismantling of the plug which is at or over that area, the oil level must be eye-controlled.
- If the gear unit is mounted vertical, by using of elbows and expansion tanks which sent with the gear unit, the oil must be filled from above. Using the expansion tank at these positions is recommended by NRW.

	NOTE !
	In continuously operating gear units because of the oil in it, it may be exposed to overheating. In these situations the use of lower viscosited oil is recommended by NRW.

5.2 Lubricant Table

	Oil Type	Ambient Temperature t°C (min / max)					
		Mineral		Synthetic			
				PAO		PG	
Viscosity	ISO VG 150	- 10°C	+ 30°C	- 20°C	+ 60°C	- 20°C	+ 60°C
	ISO VG 220	+ 10°C	+ 45°C				
	ISO VG 320	+ 30°C	+ 60°C				

PRODUCER	Lubricants		
	Mineral	Synthetic	
		PAO	PG
SHELL	Omala S2G	Omala S4GX	Omala S4 WE
EXXON MOBIL	Mobilgear XMP	Mobil SHC Gear	Glygoyle
KLÜBER	Kluberoil GEM1	Klubersynth EG4	Klubersynth GH6
AGIP	Blasia	Blasia SX	Blasia S
BP	Energol GR-XP	Energol EPX	Energol SG PX
CASTROL	Alpha SP	Aphasyn EP	Aphasyn PG
CHEVRON	Ultra gear	Tegra Synthetic Gear	HiPerSYN
TOTAL	Carter EP	Carter SH	Carter SY

It is forbidden to use different kind of oil without the approval of the NRW technical service



6.1 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 and force on the matter of dismantling and demolishing industrial waste.

Waste Oil: At the disposal of waste oil, please obey both to the environmental protection laws as well as rules and regulations those are in force into countries which the machine has been using of.

6.1.1 Disposal

The valid regulations must be taken into the consideration for the waste materials.

Gear unit components:	Material
Toothed wheels, shafts, rolling bearings, parallel keys, locking rings, ...	Steel
Gear unit housing, housing components, ...	Grey cast iron
Light alloy gear unit housing, light alloy gear unit housing components, ...	Aluminium
Worm gears, bushes, ...	Bronze
Radial seals, sealing caps, rubber components,...	Elastomers with steel
Coupling components	Plastic with steel
Flat seals	Asbestos-free sealing material
Gear oil	Additive mineral oil
Synthetic gear oil (rating plate code: CLP PG)	Polyglycol-based lubricants
Cooling spiral, embedding material of the cooling spiral, screw fittings	Copper, epoxy, yellow brass

	NOTE ! Please do not diffuse any biologically indivisible materials, oil and noninclusive components (PVC,rubber,resins and etc.) to the environment.
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	ATTENTION ! Do not reuse damaged parts during inspection, only should be changed by expert personnels.
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6.2 Troubleshooting

NO	PROBLEM	OBSERVED	SOLUTION
1	Gearbox does not work.	The noise is not coming from gearbox. Output shaft of the gearbox is not rotating. Driver / frequency inverter is not be used.	Check the connection of electric motor, voltage and frequency. The values could be same with the values which are on the motor label. Look at to the motor usage guide. If the solution is not found look to the article 50.
2	Gearbox does not work.	The noise is not coming from gearbox. Output shaft of the gearbox is not rotating. Driver / frequency inverter is used.	Look to the guide of driver / frequency inverter or driver usage guide. Determine that error is not originated from driver / frequency inverter by separating electric motor either from driver and frequency inverter and making direct connection to the motor.
3	Gearbox does not work.	A different noise is coming out of the gearbox. But gearbox and motor shaft are not rotating. Driver / frequency inverter or magnetic brake are not used.	The first thing that has to be made is to check whether motor connection, voltage and frequency are identical with motor label values. If there is not any problem, to pull out gearbox from the machine and try to operate in neutral. If gearbox works, the power of motor may not be enough to operate system. If the motor which connected to the gearbox is monophase, take off capacitors should be controlled. Even the motor does not work despite all tests and examinations, look at to the article 50.
4	Gearbox does not work.	A different noise is coming out of the gearbox. But gearbox and motor shaft are not rotating. Driver / frequency inverter or magnetic brake are used.	The frequency inverter or driver usage guide should be examined. Determine that error is originated whether from driver / frequency inverter by separating electric motor either from driver and frequency inverter and making direct connection to the motor. If the gearbox does not work, look at to the article 50.
5	Gearbox does not work.	A different noise is coming out of the gearbox. But gearbox and motor shaft are not rotating. Magnetic brake is used.	It is necessary to check whether electric motor connection, voltage and frequency are identical with motor label values. Look at to the motor usage guide. Be sure that brake is working. If the brake is assembled by us to check whether it is made correctly according to the schema at the usage and maintenance instructions. If the error is not found to check whether the brake is operating by making direct connection to the brake appropriate to the brake voltage. When the electric is given, the noise of the opening of brake will come. If the brake is not working even by giving electric, the diode of brake could be in failure. To feed the motor directly according to the informations on the label when the brake is separated from disc. If the problem is continuing, the power of the motor may not be enough. Look to the article 50.
6	Either gearbox is non operational or direction of rotation is wrong.	Wrong set up.	Please control set up and connections.
7	Either gearbox is non operational or direction of rotation is wrong.	Inside Problems.	Please contact with NRW company.



6. TROUBLESHOOTING

NO	PROBLEM	OBSERVED	SOLUTION
8	Gearbox does not work at low speeds / frequencies.	Use driver / frequency inverter.	The motor feeding frequency is declining at low speeds. For the operating of motor at very low frequencies, it is essential to adjust motor parameters and frequency inverter parameters very well. Besides for the low speeds, there could be big changes even at the gearbox efficiency. To enlarge motor power and inverter or for to reach your requested cycle range, change the gearbox ratio.
9	Gearbox does not work after long awaitings or at mornings.	Environmental temperatures are dropping below -5°C.	The gearbox oil is not suitable to the environmental temperatures where it works. It is necessary to use low viscosity oils or to protect gearbox group from cold. To find proper oil look to usage guide or examine lubricating pages from the product catalogs. To work at higher environmental temperatures could be a solution. If the problem is continuing, the motor power should be increased.
10	Gearbox is very heating up.	You use worm screw type gearbox and environmental temperature is under +40°C.	When the gearbox is working under the full load, gauge gearbox surface temperature with heat meter. If it is under +90°C it is normal and no harm to gearbox. All worm screw and ATEX compatible helical gearboxes could be used up to the +120°C surface temperatures. If the temperature is above the +120°C and gearbox is ATEX compatible immediately stop gearbox and inform to NRW. Look to the article 50. If it is the product without ATEX, to check the oil amount according to the mountage position. Be sure that the mounting position written on the label and mounting position which gearbox is working should be identical. If not look to the article 50. To the gearboxes without worm screw types at heatings above +80°C, look to the articles 9 and 50.
11	Gearbox is very heating up.	You use helical gearboxes and environmental temperature is under +40°C.	When the gearbox is working under the full load, gauge gearbox surface temperature with heat meter. If it is under +90°C it is normal and no harm to the gearbox. All gearboxes with ATEX are designed to work at maximum +120°C. If the temperature is above +120°C and gearbox is ATEX compatible immediately stop gearbox and inform to NRW. The gearboxes without ATEX are designed to work at maximum +90°C temperature values. If the gearbox temperature is above the +90°C, control the oil amount according to mounting position. Be sure that the mounting position written on the label and mounting position which gearbox is working should be identical. If there is inconsistency look to the article 50.
12	Gearbox is very heating up.	Environmental temperature is above +40°C.	The standard gearboxes are designed to work at maximum +40°C. Temperatures above +40°C, special applications and additions should be done. In these situations please consult to NRW.
13	Gearbox is very heating up.	There is no oil inside of the gearbox.	Please add oil to the gearbox.
14	Gearbox is very heating up.	Oil level is wrong.	Please bring gearbox to correct oil level. (Oil/grease)



NO	PROBLEM	OBSERVED	SOLUTION
15	Gearbox is very heating up.	Excessive Dust Coat.	Please clean the gearbox.
16	Gearbox is very heating up.	Insufficient Ventilation.	Please contact with NRW company.
17	Gearbox is very heating up.	Inside Problems.	Please contact with NRW company.
18	Gearbox is working noisy.	Noise is irregular.	Control the mobile machine elements. Operate gearbox without load by seperating from the system. If the same noise is continuing, foreign objects could be in the oil. Change the oil and control the foreign objects in the oil. If the metal piece is found into the controlled oil, the gearbox could be damaged. Look to the article 50.
19	Gearbox is working noisy.	Noise is regular and perpetual.	Control the mobile machine elements. Operate gearbox without load by seperating from the system. If you hear the same noise, bearings which belong to gearbox or motor could be in failure. Look to the article 50.
20	Gearbox is working noisy.	Noise is regular with clicking.	Control the mobile machine elements. Operate gearbox without load by seperating from the system. If the same noise is continuing, gearbox parts could be damaged. Look to the article 50.
21	Gearbox is working noisy.	Noise is regular and fluctuating.	Control the flexure of connection elements which connect to output shaft. Seperate element which is connected to output shaft and operate gearbox without load. If the same noise is continuing, look to the article 50.
22	Gearbox is working noisy.	Gearbox has motor with brake and noise is coming from the brake side.	The noises could be coming from the brake like in the shape of low level randomly tickings and it is normal. If the noise level is disturbing, brake could be damaged or there may be a problem at the gap adjustment between lining and disc. Look to the article 50.
23	Gearbox is working noisy.	You use frequency invertor and the noise is changing every time by the change of cycle.	Frequency invertor parameters may not be compatible with your used motor. Examine frequency invertor usage guide and if the same problem is continuing look to the article 50.
24	Gearbox works with excess noise.	Inside Problems.	Please fix oil level.
			Please fix grease amount.
			Please contact with NRW company.



6. TROUBLESHOOTING

NO	PROBLEM	OBSERVED	SOLUTION
25	Gearbox works with excess noise.	External Problems.	Please control pinion gear and bearings. Please control screw connections. Please control configuration.
26	Excessive vibration at the gearbox.	Wrong set up.	Please control configuration and tightness of screws.
27	Excessive vibration at the gearbox.	Inside Problems.	Please contact with NRW company.
28	Oil leakage is existing.	Oil leakage from the seal.	If the environmental temperature is above +40°C and there is continuous working over 16 hours, according to the mounting position pull out a plug which is on the top and use ventilation plug instead of it. If your situation is not suited to this, seal could be damaged. Look to the article 50.
29	Oil leakage is existing.	Oil is leaking from the plug.	If you use the ventilation plug, be sure that the plug is at the right position. According to the mounting position of the gearbox, plug which is on the top could be ventilation plug. The plug may loosened, clean the surface and plug itself and squeeze it again. If the same problem is continuing, look to the article 50.
30	Oil leakage is existing.	Oil is coming out of the the housing.	To observe where the oil is exactly coming from. It is leaking from the oil plug, oil cover or seal and could flow onto the housing. If the situation is like this, look to the article 18 and 19. If you sure that oil is coming out of the housing there could be cracks and fractures at the housing. Look to the article 50.
31	Oil leakage is existing.	Oil is coming out of the the cover.	A gasket that is used between cover and housing is not performing its leaktightness duty. Dismantle the cover clean the bottom side and assemble cover to its place by smearing liquid gasket. If the problem continues look to the article 50.
32	Oil leakage is existing.	Damaged or detrited seals.	Please contact with NRW company.
33	Oil leakage is existing.	Ventilation plug is clogged.	Clean the plug or change it.
34	Gearbox is making regular vibrations when it is worked at the assemble point.	You use torc arm.	The reason of the vibration of gearbox is originated from the shaft flexure which gearbox is connected. When the torc arm is used, it has no harm to gearbox and it is usual situation.



NO	PROBLEM	OBSERVED	SOLUTION
35	Gearbox is making random vibrations when it is worked at the assemble point.	You use torc arm.	The reason of the vibration of gearbox is because of shaft flexure which the gearbox is connected and passing gap between shaft and bushing. Control your shaft hole passing tolerance. When the torc arm is used, it has no harm to gearbox and it is usual situation.
36	Motor is warming a lot.	Motor is working above its normal ampere. Environment is clear.	There could be overloading or motor power is insufficient. Motor could be in failure. Look to the article 50.
37	Motor is warming a lot.	Environment is dusty.	Be sure of whether motor fan bowl and motor cooler cores are clean for the air passing. If you use extra fan be sure that it is working. If there is invertor usage at the motor and works at low frequencies, the motor fan may not be sufficient. Use extra fan in these situations. If the problem continues look to the article 50.
38	Motor shaft is rotating but gearbox shaft is not.	Friction noise is coming from inside of gearbox or only there is motor noise.	There could be a damage at the gearbox parts. Look to the article 50.
39	Motor shaft is rotating but gearbox shaft is not.	You use chain geared or pinion geared at the output shaft of gearbox.	The damage could be originated of poligon impact formed by chain geared or from the radial load. Gearbox connection points may not be rigid enough. Be sure that you are able to use proper chain geared and pinion geared for used gearbox. Recalculate maximum allowable radial load according to this position. Look to the article 50.
40	Output shaft is cut.	You use either chain geared or pinion geared.	The damage could be originated of poligon impact formed by chain geared or from the radial load. Gearbox connection points may not be rigid enough. Be sure that you are able to use proper chain geared and pinion geared for used gearbox. Recalculate maximum allowable radial load according to this position. Look to the article 50.
41	Gearbox is stopping too late.	You use motor with brake	Control the electric connection schema of brake. Be sure that there is not assembled delayed diode onto the brake. If there is delayed diode, it could be changed. (Hoisting gearboxes are excluded PCS)
50	Service is required.	Informing of NRW Company.	Please contact with NRW company. Communication informations are given at the usage guides,catalogs. Mechanical parts can only be changed either by NRW or within the knowledge. Any change that is to be made without the knowledge of NRW would cancel both guarantee of product and all certificate declerations and remove the responsibilities of NRW over the product.

If there are problems or malfunctions different to the onesdescribed here contact a NRW Industries Assistance Centre.



7. AUTHORIZED SERVICE

7.1 Authorized Service

They are skill and qualified people, which are determined by company. They have education about electrical and mechanical subject.

	<p>NOTE !</p> <p>At below; the list took in place decided by our firm, authorized service and customer (user) which is about control and maintenance criterias/applications. Must be obliged to the informations which were given in the list. To the contrary that Usage and Maintenance directions become invalid.</p>
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No	CRITERIA	MANUFACTURER (NRW)	AUTHORIZED SERVICE	CUSTOMER (USER)
1	Disassembly of geared unit	✓	✓	X
1.1	Case changing	✓	✓	X
1.2	Gear changing	✓	✓	X
1.3	Solid/shaft changing	✓	✓	X
1.4	Changing of all consumable material except sealing materials.	✓	✓	X
2	Oil cup changing	✓	✓	✓
3	Seal changing	✓	✓	✓
4	Oil changing	✓	✓	✓
5	Assembly of geared unit with W cylinder type	✓	✓	✓

✓ : SUITABLE

X : NOT SUITABLE

2-3 : Send to the contaminated waste disposal (licensed firm).

4 : Send to the licensed firm for the purpose of disposal.

**MANUFACTURER AND SERVICE STATION ADDRESS: (Factory)**

ATA MAH. ASTİM ORGANİZE SAN. BÖL. 1.CAD. NO: 4 Efeler / AYDIN / TURKEY

Tel : +90 256 231 19 12 - 16 Pbx
Fax : +90 256 231 19 17
Web : www.pgr.com.tr
e-mail : info@pgr.com.tr - satissonrasi@pgr.com.tr

SERVICE STATION ADDRESS: (Assembling and Service Maintenance)

UMURLU MAH. AYDIN OSB. NO: 66 Efeler / AYDIN / TURKEY

Tel : +90 256 231 19 16 Pbx
Fax : +90 256 231 19 17
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