

Soft/Middle Hard Gear-face Reducer

Operation Manual NO.009M

V2.1-2018

WGT[®] Hangzhou WeiGao Transmission Machinery Co., Ltd.



Thank you for choosing our company' s procucts. Please read carefully and keep this manual for installation, operation and maintenance of the product

Safety instructions

During and/or after the operation, the reducer and its motor will result in electric and moving parts and high temperature on surface, and only those qualified are allowed to handle, store ' install, mount, connect, operate, maintain and repair it ' with following rules to be complied with:



- Ø Related operation instructions and wiring diagrams;
- Ø Waming and safety labels;
- Ø Special rules and requirements on the equipment; WGT.asia
- Ø State, local or industrial regulations on safety and accident prevention

OperationIUse

Check the rotating direction when the reducer is not connected to power supply (note whether there is noise duringrotation). If driving parts are not connected during commissioning, secure the keys of gears. Testing and protective device shall be provided for commissioning.

When abnormal temperature rise, noise or vibration occurs, tum off the primary motor and find out the cause. Contact us if required. WGT.asia

Disposal



The company has passed the national environmental management system of the People's Republic of China, here is an obligation to remind you:Please follow the local regulations:

- ♦ The box body parts, gear, shaft and reducer rolling bearings should be handled as a waste of iron and steel. As long as there is no special collection measures, the provisions also apply to the parts made of gray cast iron WGT.asia
- ♦ Collecting the waste oil and in accordance with the regulations

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1. Products description

- Ø QJ series crane reducer includes QJR-D、QJS-D、QJRS-D、QJR、QJS、QJRS、QJ-L、QJ-T reducers. It is suitable for all related organizations in cranes. It could also be used in petroleum, chemical, light industry, mining, cement, constructions and other industries.

Structure characteristic WGT.net.cn

- ² QJ series crane reducer is produced according to JB/T8905 standard. The gear and gear shaft is made by alloy steel 42CrMo, quenching and tempering hardness is 291-323HB, the material of the gear is 35CrMo, quenching and tempering hardness is 255-291. Compared with soft gear-face reducer, the loading capacity is higher.
 - ² QJR、QJS、QJRS adopts welding housing, using three protection installation. It could be mounted with horizontal or vertical way and used easily.
 - ² The output shaft of QJ-T is taper hollow shaft which is mounted easily.
 - ² The vertical mounted reducer could be equipped with lubrication motor pump. It has the long lifespan.
- Ø The cylindrical reducer includes ZQ、ZD、ZL、ZS、ZSC and other series like ZQD、ZQA、ZSC (A)、ZQH、ZDH、ZLH、ZSH series reducer. It is widely used in petroleum, chemical, light industry, mining, cement, constructions and other industries. WGT.net.cn

Structure characteristic

- ² The cylindrical reducer adopts involutes gear transmission, split housing. It is repaired easily.
- ² ZSC(A) is suit type. Output shaft is taper hollow shaft. It is mounted easily. WGT.net.cn
- ² ZDH、ZLH、ZSH、ZQH series gear use double circular tooth gear. It has steady transmission. The mounting size should be same with involution gear reducer.

2. Application Range

Ø QJ series reducer working conditions should meet the following requirements.

- ² The peripheral speed of the gear transmission would be less than 16m/s. WGT.asia
- ² The input shaft speed should be less than 1000r/min.
- ² The working environment temperature should be -40°C ~ 45°C. When the reducer works in very cold environment, it is necessary to preheat the lubrication oil in advance or use the subzero oil.
- ² The gear reducer could run with positive and negative directions. WGT.net.cn

Ø The cylindrical reducer working conditions should meet the following requirements.

- ² The input shaft speed should be less than 1500r/min ;
- ² The working environment temperature should be -40°C ~ 45°C. When the reducer works in very cold environment, it is necessary to preheat the lubrication oil in advance or use the subzero oil.
- ² The gear reducer could run with positive and negative directions. WGT.net.cn

Ø Note: When the motor and gearbox are connected by the pulley wheel(gear or chain), please notice the input torque which would be influenced by the ratio of the pulley wheel. And also the extra radial force would also influence the reducer type chosen WGT.asia

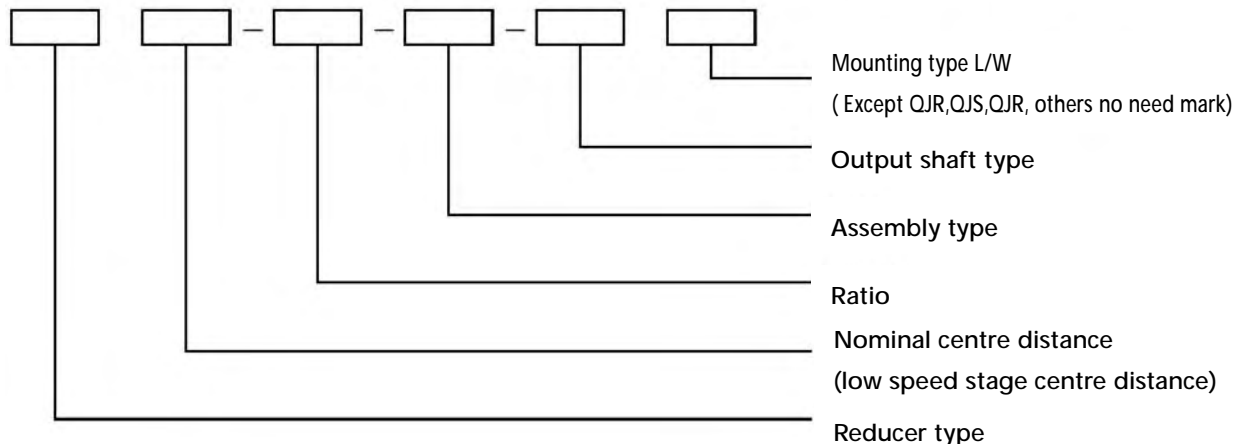


Ø Note: In the actual application, when the input shaft is equipped with the lubrication oil pump, please confirm the direction of rotation. Please refer from the direction face to the output shaft, please claim it before ordering.

3. Product type-QJ series reducer

- Ø The name plate of the products would attach the information of the product. It records the product type, function, ex-factory date and serial number. For checking and repairing easily, please do not take part it without permission. WGT.asia

The example of the name plate type introduction:



Mark example:

QJR-D type reducer low stage centre distance is 500, ratio is 20, second assembly type, output shaft is C gear type

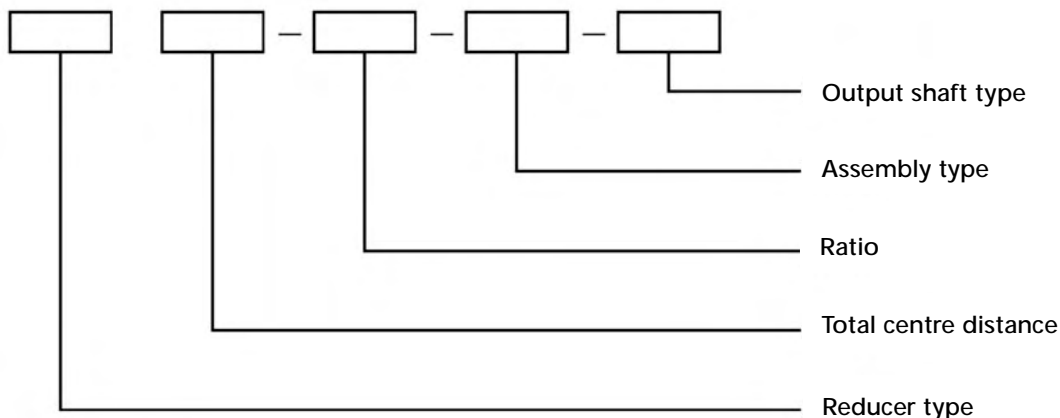
Mark:QJR-D500-20-II-C WGT.asia

The outsize of the products and technical data please refer the catalogues.

4. Product type-Cylindrical gear reducer

- Ø The name plate of the products would attach the information of the product. It records the product type, function, ex-factory date and serial number. For checking and repairing easily, please do not take part it without permission.

The example of the name plate type introduction: WGT.asia



Mark example:

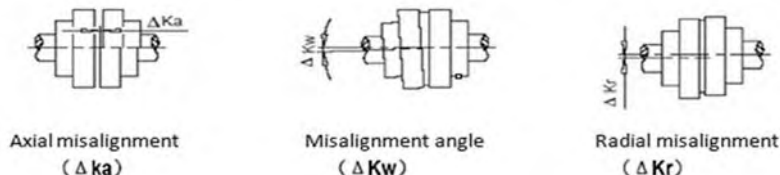
The total centre distance of ZQ type reducer is 500m ratio is 40.17, the second assembly type, Output shaft type is C gear type

Mark: ZQ500-40.17-II-CWGT.asia


The outsize of the products and technical data please refer the catalogues.

5. Mounting and coupling

- Ø The gear reducer should be mounted on the stable, smooth and rigid base without any shake. Please consider seriously in case of special working situation. WGT.asia
- Ø The difference compensation coupling way should be considered in advance when couple the gear reducer and prime motor. The input shaft axis and the coupling part shaft axis should be confirmed with coaxiality. At the same time, please check the axial difference and angular displacement. The difference should be less than the coupling allowable value. When the outside diameter circular linear speed of the coupling is less than 30M/s, it needs to process static balance. When the outside diameter circular linear speed of the coupling is more than 30M/s, it needs to process dynamic balance. Or the bearing and shaft of the reducer would be easily broken because of the wrong mounting.



- Ø When the reducer is worked with belt pulley, gear or chain, please check the radial force according to the catalogues. In the middle of the input shaft, the radial force should be less than $125 \times \sqrt{T_1}$ (N), In the formula, T_1 is the reducer input torque(N.m). Or it would easily result in the reducer bearing broken or shaft broken.
- Ø When using hydraulic coupling connecting, due to the higher installation requirements, it may cause the shaft broken because of big additional force to the gear reducer input shaft when the coupling is equipped in the shaft of reducer. Please check the shaft additional tolerance with the catalogue before using the reducer. We suggest to assemble the hydraulic coupling in the shaft of prime motor, because the input shaft diameter of the reducer is usually smaller than the prime motor diameter. WGT.asia

- Ø If the reducer is equipped with water cooling system, please confirm if there is leaking.
 - Ø After finishing of mounting, fill the lubrication oil into the reducer. When the lubrication oil is stable and static, the oil level should reach the middle line of the oil gauge. WGT.net.cn
 - Ø Switch on, and make the reducer work with unloading. Check the lubrication system good or not, if there is any leaking, parts loosening and special noise. If there is no special problem, the reducer could start work.
 - ² Please keep the switch off when mount the coupling.
- 
- ² It is forbidden to hit the coupling and gear into the shaft with hammer.
 - ² Please notice the correct tension when mount the belt pulley.
 - ² The exposed rotation part of reducer (coupling, belt pulley) should be covered.
 - ² The coupling and flange surface should be totally clear. If there is rust or dust, please use solvent to clean but not make the solvent into the seal, or it would make the seal broken.

6. Working of the reducer WGT.net.cn

Checking items before operation

- Ø Before using, please check if there is lubrication oil in the reducer housing and if the oil level is right or not. If the oil is not enough, please fill in time.
- Ø If there is loosening in each coupling part and if the protection equipment is already set.
- Ø Please check the running direction is right or not for the reducer with backstop.
- Ø When the ambient temperature is under 0°C, please check the oil pour point is meet to work. Usually the pour point of the lubrication oil for split or force lubrication should be more than 15°C under the ambient temperature. When dip lubrication, the pour point should be more than 10°C under the ambient temperature. If could not meet, please make the lubrication oil hot. WGT.net.cn

Running of the reducer

- Ø The reducer should work with unloading about 5-10 minutes (If the reducer is equipped with motor pump, please start the motor pump before the reducer working) to make the bearing and gear be lubricated enough. If the reducer is used first time, please add the loading by stages, every stage adds 20% loading and work about 1-2 hours until full loading without any special problems. WGT.net.cn
 - Ø When the reducer works, please make the records of the reducer temperature. When the reducer temperature is higher than 70°C or the oil temperature is higher than 90°C, please stop the reducer. And then check the reasons and make the solutions, if necessary, please contact with our after sales service department. It could only be used after changing the lubrication oil after the problem is solved
 - Ø To stop the reducer should follow the steps: First stop the passivity machine. After the machine totally stopped, cut off the power of the reducer motor. (If the reducer is equipped with motor pump, please stop the motor pump after reducer stops)WGT.net.cn
 - Ø If the reducer would be stopped in long time, please make the reducer run every 2-3 weeks.
 - Ø If the reducer stops working for more than 6 months, please take the anti-rusty actions to gear reducer inner and outside part. Fill the lubrication oil full. Use the wax antirust coating to the shaft and no painting part of reducer. And make the grease on the seal part to stop the antirust agent in.
- ² In the beginning, the oil pump would have noise because of the high viscosity of lubrication. The noise would disappear after the reducer working for some time and temperature higher.
- ² Please clean the filter and confirm the oil system unblocked when the oil pump has big noise.
- ² Please watch the oil leaking situation of the reducer. If there is oil leaking, please stop the reducer and solve in time. WGT.net.cn



Reducer Lubrication

Lubrication way: WGT.net.cn



- ≥ **Split lubrication:** The oil level is low. It makes the gear and bearing lubricated through the split oil.
- ≥ **Dip lubrication:** The oil level is high enough to make the gear and bearing all in the oil. Usually the reducer should be equipped with the oil tank.
- ≥ **Forced lubrication:** It should be equipped with lubrication oil pump, oil coils, filter, pressure regulating, heat and cooling parts. (according to the requirements)

The working of horizontal reducer

- Ø When the power is meet with the thermal power in the catalogue, the horizontal reducer usually adopts the split lubrication. The oil level should be in the middle of oil gauge.
- Ø When the power is more than the thermal power in the catalogue, the horizontal reducer needs to use forced lubrication or dip lubrication with cooling part.

The working of vertical reducer WGT.net.cn

- Ø Please adopt forced lubrication or oil tank when using. And please add the cooling parts, when power is more than thermal power in the catalogue.



The forced lubrication ones should be filled with lubrication oil, when they are stopped more than 24 hours and started with full loading. WGT.asia

7. Repairing and maintenance

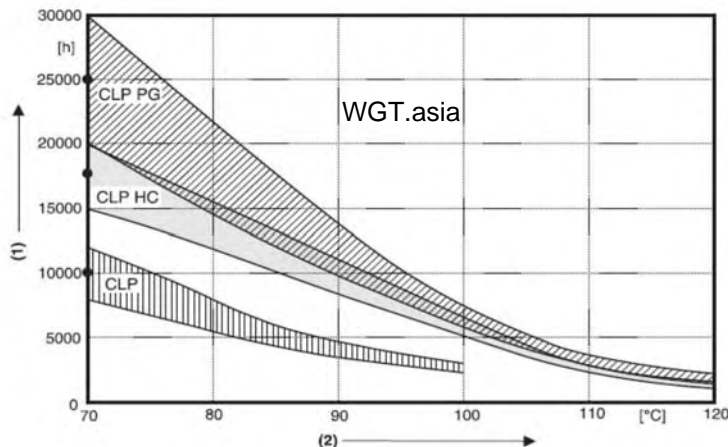
Ø Repairing and maintenance time interval WGT.asia

Time interval	Repair and maintenance
Normal operation	Check the temperature of reducer: no more than 90°C when using mineral lubricating oil, no more than 100°C when using synthetic lubricating oil Check whether there is abnormal noise of reducer Check whether there is leakage of reducer
After 500 ~ 800 hours operation	First lubricating oil replacement after initial operation Check the oil level to determine the oil filling
Every 3000-hour operation, at least once half a year	Check the lubricating oil, and, in case of outdoor or damp environment, ensure that the water content in lubricating oil shall be no more than 5000ppm Replace mineral lubricating oil (working hour less than 8h per day) Clean the air plug
As per operating condition, at least once 3 month	Replace the mineral lubricating oil (long time continuous work) Check whether there is any joint bolt losing Check the situations of contamination and lubricating and cooling devices Clean the filter of lubricating oil and replace filter core if required
As per operating condition, at least once a year	Replace synthetic lubricating oil
As per the environment and operating condition	Improve or replace the protective (rustproof) paint on surface Clean the surface of reducer, Check the accessory devices equipped

Ø Time interval of lubricating oil replacement WGT.asia

Regularly replace the lubricating oil of special type reducer that works in severe environment. The figure below

shows the time interval of lubricating oil replacement in normal environment.



(Note: CLP-EP industrial gear oil, CLP HC-Middle duty industrial gear oil, CLP PG-HD industrial gear oil)

(1) Operation time (2) Continuous temperature in oil bath (average value of 70°C)

8. Viscosity of lubricating oil WGT.asia

The viscosity of lubricating oil shall be determined in accordance with the peripheral velocity V , working environment or lubricating method of the high-speed gears:

When $V \leq 2.5 \text{ m/s}$ or ambient temperature is within $35^\circ\text{C} \sim 50^\circ\text{C}$, choose the CKC320 medium-load industrial closed gear oil or CKD320 heavy-load industrial closed gear oil;

When $V > 2.5 \text{ m/s}$ or forced circulating lubrication is applied, choose the CKC220 medium-load industrial closed gear oil or CKD220 heavy-load industrial closed gear oil. WGT.asia

Lubricant



Lubricating grease is not recommended for reducer. Contact us if required.

See **Annex-Lubricating Oil Comparison Table** for domestic and foreign lubricating oil products.

9. Fault Analysis and Solutions WGT.asia

Faults	Causes	Solutions	Faults	Causes	Solutions
Abnormal and regular operational noise	A. Rolling /milling noise: bearing damaged B. Knocking noise: uneven joggling	A. Check the lubricating oil and replace the bearing B. Contact us WGT.asia	Leakage of lubricating oil: Junction surface of reducer	Loosening of connecting parts of reducer	Check the connecting bolts and tighten the loose ones if required Check the sealing part and replace it if required Check oil level/ improve exhaustion Contact us
Abnormal and non-regular operational noise	Impurity of lubricating oil	Check the lubricating oil Stop operation and contact us	End cover surface of reducer	Loosening of connecting fastener	
Abnormal noise in fixed parts of reducer	Fastener of reducer looses	Check the fasteners and use the those specified	Cover of sight hole of reducer	Incorrect installation of sealing parts	
Too high temperature of operation	A. To much lubricating oil B. Aging and deterioration of lubricating oil C. Plentiful impurity in lubricating oil D. Damage of lubricating pump E. Fault of cooling system	A. Check oil level and make modification if required B. Check the replacement time of lubricating oil C. Check the lubricating oil D. Check the lubricating pump and replace it E. Check the cooling system	Sealing point of shaft	Damage/abrasion of sealing parts	
			Oil discharge plug	Loose connection	
Over-high temperature on sealing point of shaft end in running-in period	Insufficient cleaning of connection of shaft end during installation Running-in of sealing parts and shaft end	Clean the shaft end Consider it as normal Contact us	Air plug	Too much oil level of lubricating oil Incorrect installation	A. Check oil level and make modification if required B. Check the replacement time of lubricating oil C. Check the lubricating pump and replace it D. Check the bearing and replace it
			Too high temperature on the bearing	A. Insufficient lubricating oil B. Aging and deterioration of lubricating oil C. Damage of lubricating pump D. Damage of bearing	

When consult with us, please provide the information:

Full name plate information - **problems type and range** - **Broken time and appearance** - **possible cause**



















Packing List of Reducer

No.	Content	Qty.	Optional Accessories
1	Reducer	set	
2	Certificate of approval	1copy	
3	Reducer Operation Manual	1copy	
4	The factory inspection records	1copy	
	WGT.asia		

Stuffing operator signature:





















Date: WGT.net.cn

Annex-Lubricating oil Comparison Table(Mineral Lubricating Oil) WGT.asia

Category	Standard	Brand	Type	Viscosity cSt		Freezing Point °C
				40°C	100°C	
220	ISO/VG220 AGMA/5EP	Mobil	Mobilgear 630	220	19.5	-24
		Mobil	Mobilgear XMP 220	220	18.8	-24
			Omala Oil F220	220	19.4	-18
			Energol GR-XP220	222	18.9	-21
			Alpha SP220	222.1	19.41	-15
			Carter EP220	220	19	-21
	DIN51517-3		Meropa 220	198~242	-	≤-9
	DIN51517-3		Degol BG220	198~242	-	≤-9
	DIN51517-3		Renolin CLP220 Plus	198~242	-	≤-9
	DIN51517-3		Kluberoil GEM 1-220N	198~242	-	≤-9
320	ISO/VG320 AGMA/6EP	Mobil	Mobilgear 632	320	24.5	-18
		Mobil	Mobilgear XMP 320	320	24.1	-18
			Omala Oil F320	320	25.0	-18
			Energol GR-XP320	322.5	24.3	-18
			Alpha SP320	322.44	24.79	-15
			Carter EP320	320	24.5	-15
320	DIN51517-3		Meropa 320	288~352	-	≤-9
	DIN51517-3		Degol BG320	288~352	-	≤-9
	DIN51517-3		Renolin CLP320 Plus	288~352	-	≤-9
	DIN51517-3		Kluberoil GEM 1-320N	288~352	-	≤-9
	GB 5903		L-CKD 320 WGT.asia 313	320.1	-	-9
	GB 5903		L-CKD 320	320.1	-	-9

Note:for your reference

Annex-Lubricating oil Comparison Table(Synthetic Lubricating Oil) WGT.asia

Category	Standard	Brand	Type	Viscosity cSt		Freezing Point °C	Category	Standard	Brand	Type	Viscosity cSt		Freezing Point °C
				40°C	100°C						40°C	100°C	
220	ISO/VG220 AGMA/5EP DIN51517-3 GB 5903	Mobil	Mobilgear SHC 220	220	26	-36	320	ISO/VG220 AGMA/5EP DIN51517-3 GB 5903	Mobil	Mobilgear SHC 320	320	35	-33
		Mobil	Mobilgear SHC XMP 220	220	27.8	-45			Mobil	Mobilgear SHC XMP 320	335	38.3	-38
			Omala HD220	229.4	28.3	-45				Omala HD320	312.7	35.4	-42
			Enersyn SG-XP220	237	31.8	-39				Enersyn SG-XP320	325	33.8	-35
			Alphasyn GS220	223	36.3	-45				Alphasyn GS320	318	52	-42
			Carter SH220	220.1	26.2	-45				Carter SH320	313.8	34.6	-42
			Pinnacle EP220	220	26.2	-36				Pinnacle EP320	320	35.4	-36
			Degol PAS220	220	-	-51				Degol PAS320	320	-	-48
			Renolin Unisyn CLP220	220	25.7	-54				Renolin Unisyn CLP320	320	36.6	-54
			Klubersynth EG 4-220	220	-	-35				Klubersynth EG 4-320	320	-	-30
			4408/220	212.8	25.64	-43				4408/320	326.6	34.68	-41
			L-CKT 220	219.3	25.38	-48				L-CKT 320	318.6	33.68	-42

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Note:for your reference