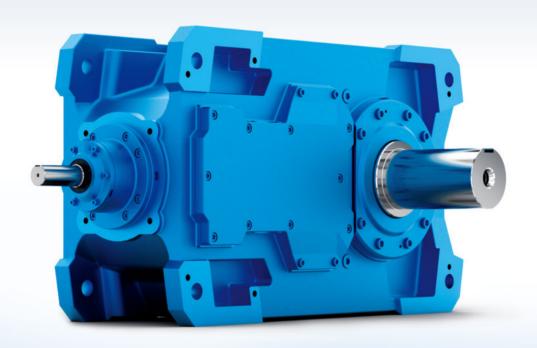
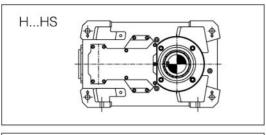
BONENG

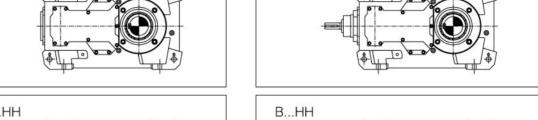


H@B Heavy Duty Gearbox

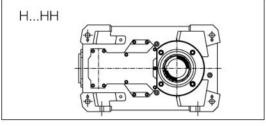
Instruction Book

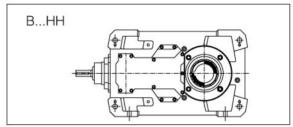
Gear unit type (4-12 types)

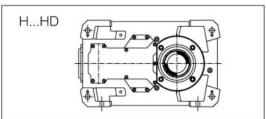


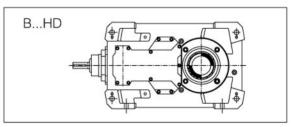


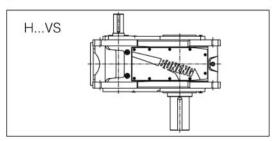
B...HS

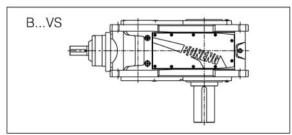


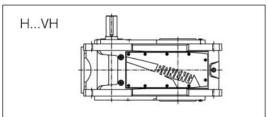


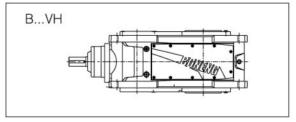


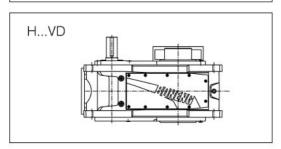


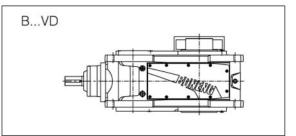












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Important notes

During installation, please pay attention to the safety notes and alarms in this book!



Suggestions and useful information



Harmful situations:

Possible result: damage transmission device and the environment



- ◆ If you conform to the regulations in this manual, there won't be any fault, at the same time, it can satisfy the requirements of quality defect claim. So before the transmission device starts working, please read this instruction.
- ◆This instruction book contains important installation and maintenance notes, please keep this instruction book in a place near the device for reference;

1 Safety instructions

Safety instructions mainly involve the applications of gear boxes. When apply gear boxes, please pay attention to relevant safety notes in this instruction book!

- ◆This manual is an organic component of the gear box we supply.
- ◆ Maintainers and operators of the gear box should carefully read this instruction manual and conform to the regulations in it.
- ◆ Strictly conforming to the regulations in instruction book is a necessity for realizing non–fault running and performing any quality assurance requirement.
- ◆ Under the premise of conforming to instruction book, you should pay attention to:
 - →National (Local) regulations for relevant safety and accident preventions;
 - →Special regulations and requirements of relevant devices;
 - →Safety alarm and safety mark on device.
- ◆The following situations will cause human injury and property loss:
 - →Inappropriate use;
 - →Wrong installation or operation;
 - →Violate regulations to tear down necessary protective cover or machine cover.
- ◆Any damage or stop caused by violating regulations of this instruction book will not be responsible by the company.
- ◆To seek for technical advance, we keep the right to modify. With continuous improvements, we will further improve its performance and safety performances on the foundation of keeping the basic characteristics.

2 Technical instructions

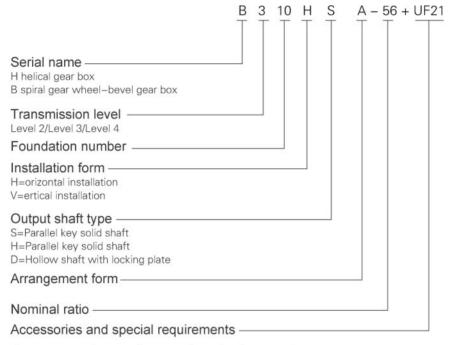
2.1 Nameplate instruction

\oplus	BO	NENG			CE ⊕
Туре		(D		
n2		2	2)		RPM
P ₁	3	kW	T2	4	N • m
n1	(5)	RPM	i	6	
Oil	7	L		8	kg
NO.	9		Date	10	
Φ					0

- 1 Product type
- 2 Output speed (only for directly connected motor)
- 3 Rated input power kW (it means motor power for directly connected motor)
- 4 Rated output torque
- ⑤ Rated input speed (it means motor speed for directly connected motor)
- 6 Nominal ratio
- 7 Oil quantity L
- 8 Weight
- 9 Product number
- 10 Delivery date
- ◆ Data on nameplate are very important, please read them carefully and keep them clean. When services are needed, please provide the product number, using time and fault category on it.

2.2 Type designation

◆ For example: helical bevel gear-helical gear box B310HSA-56+UF21



Accessory codes can be seen in selection sample

◆Type designation is only for reference, special supply category please consult.

2.3 Noise level of gear box

- ◆ Noise conforms to relevant national standard, industrial standard and enterprise standard.
- ◆Inspection of noise is done according to sound density theory, it is inspected in a distance of 1 meter (the surface noise region).
- ◆ Noise level is tested when gear box is under good working situation with regulated rated input speed and rated input power. If the parameters are different, select the highest speed and maximum power.
- ◆If the applied inspection technology makes repeated measurement can't get the final result, you should apply the inspection result obtained from the test platform of our company.

Specific noise level can refer to table 2.3.1-2.3.4 (Measurement of surface noise level doesn't include the noise of accessories of lubrication device).

2.3.1 Noise level of the gear box with no fan (H series):

			Noise	e level of	the surfa	ce of bev	el gear b	ox with	no fan	LPA, U	nit: dB
H2	Ratio	Speed r/min			Fo	undation	number	of gear	box		
		.,,,,,,,,	04	05	06	07	08	09	10	11	12
	6.3	1740	76	78	80	80	81	83	84	85	86
		1450	71	74	75	76	77	79	79	80	81
	_	1150	66	69	70	71	72	74	74	75	76
	10	960	63	66	67	67	69	70	71	72	73
	11.2	1740	75	77	78	79	80	82	82	83	84
H2		1450	69	72	73	74	75	77	77	78	79
	-	1150	64	67	68	69	70	72	72	73	74
	16	960	61	64	65	66	67	69	69	70	71
	18	1740	72	75	76	77	78	79	79	80	80
	00.00E/	1450	66	69	70	71	72	74	74	75	76
	_	1150	61	64	65	66	68	69	69	70	71
	22.4	960	1)	61	62	63	64	66	66	67	68
	16	1740	_	76	77	78	78	78	79	81	81
		1450		68	69	73	74	74	75	77	77
	-	1150	_	63	65	68	69	69	71	72	73
	35.5	960	_	60	61	65	66	66	67	69	69
	40	1740		70	72	75	76	76	78	79	80
		1450	_	65	67	70	71	71	73	74	75
НЗ	_	1150	-	1)	62	65	66	66	68	69	70
110	63	960	_	1)	1)	62	63	63	65	66	67
	71	1740	_	66	68	71	72	73	76	77	78
		1450	-	62	64	67	68	68	70	71	72
	_	1150	_	1)	1)	62	63	63	65	66	67
	100	960	-	1)	1)	1)	1)	1)	62	63	64
	71	1740	_	_	_	71	72	73	74	75	76
		1450		_	_	66	67	68	69	70	71
	1,-1	1150	-		-	62	63	63	64	65	66
	140	960	-	-	-	1)	1)	1)	61	62	64
	160	1740	_	_	_	68	69	70	70	72	72
	_	1450	_	_	_	64	65	66	66	68	68
H4	1 - 1	1150	_		_	1)	60	61	62	63	64
	250	960	_	_	_	1)	1)	1)	1)	60	61
	280	1740	_	_	_	66	67	68	69	70	71
		1450	_	-	_	61	62	63	64	65	66
	_	1150	_		_	1)	1)	1)	1)	60	61
	400	960	_		_	1)	1)	1)	1)	1)	1)

1)LPA < 60dB(A)



Instruction: The noise level listed in table is determined according to the evaluation result of quality inspection department. From the meaning of statistical probability, gear box will not exceed this noise level.

2.3.2 Noise level of the gear box with no fan (B series):

				Surface r	noise leve	of bevel	gear box	with no fa	an LPA, l	Jnit dB	
Туре	Ratio	Speed r/min			Fo	undation r	number of	f gear box	(
		////////	04	05	06	07	08	09	10	11	12
	5	1740	79	82	84	86	87	88	90	91	92
		1450	75	78	80	82	83	84	86	87	88
	_	1150	70	72	73	76	77	78	79	81	82
B2	8	960	63	65	66	69	71	72	73	74	75
DZ.	9	1740	74	77	78	80	82	83	84	86	87
	Marie	1450	71	74	75	77	79	80	81	83	84
	_	1150	65	67	69	72	73	74	76	77	78
	14	960	1)	60	63	65	66	67	69	71	72
	16	1740	72	75	78	79	80	81	83	85	87
		1450	68	71	74	75	76	77	79	81	83
	_	1150	63	66	68	69	70	72	73	75	77
	31.5	960	1)	1)	61	62	64	65	66	68	71
	35.5	1740	69	71	74	75	75	76	78	81	83
B3		1450	65	67	70	71	71	72	74	77	79
B3	_	1150	1)	62	65	65	66	66	69	71	73
	56	960	1)	1)	1)	1)	1)	1)	62	65	67
	63	1740	65	68	74	71	72	72	74	77	79
	92.00	1450	61	64	70	67	68	68	70	73	75
	_	1150	1)	1)	63	62	62	62	65	68	70
	90	960	1)	1)	1)	1)	1)	1)	1)	61	63
	100	1740	_	68	69	71	72	74	76	79	80
		1450	_	64	65	67	68	70	72	75	76
	_	1150	-	1)	1)	61	63	64	67	69	70
	125	960	_	1)	1)	1)	1)	1)	1)	62	64
	140	1740	1 —	64	65	67	69	70	72	75	76
200		1450	_	60	61	63	65	66	68	71	72
B4	_	1150	-	1)	1)	1)	1)	61	63	65	67
	224	960	-	1)	1)	1)	1)	1)	1)	1)	1)
	250	1740	-	60	63	65	67	68	70	72	74
	50, 80	1450	10=0	1)	1)	1)	62	63	65	67	69
	_	1150	-	1)	1)	1)	1)	1)	1)	62	63
	400	960	-	1)	1)	1)	1)	1)	1)	1)	1)

Note: 1)LPA < 60dB(A)

2.3.3 Noise level of gear units (H series) with fan:

			Noise	level of n	neasurem	nent surfa	ce of beve	el gear b	ox with fa	an LPA,	Unit dB
Туре	Ratio	Speed r/min			Fo	oundation	number o	of gear be	ΟX		
			04	05	06	07	08	09	10	11	12
	6.3	1740	81	82	83	85	86	87	88	90	93
		1450	75	76	77	80	81	82	84	85	86
	_	1150	69	71	72	74	75	77	79	80	81
	10	960	66	68	69	70	72	73	75	76	77
	11.2	1740	78	80	82	84	85	86	87	89	92
H2	1.50	1450	73	75	77	79	80	81	82	85	88
112	_	1150	68	69	70	72	73	75	77	79	80
	16	960	64	66	67	69	70	71	73	74	76
	18	1740	76	78	80	82	83	85	87	89	90
	142	1450	71	73	75	77	78	80	82	84	86
	_	1150	65	67	68	71	72	73	75	77	78
	22.4	960	62	64	65	67	68	69	71	73	74
	16	1740	0,=0	73	74	77	78	80	80	83	84
	5.50	1450	_	71	72	75	75	77	77	80	80
	_	1150	-	65	66	69	70	71	72	74	75
	35.5	960	7-8	62	62	66	67	67	68	70	70
	40	1740	0-0	72	74	75	76	78	79	82	83
H3		1450	-	70	71	73	74	76	76	79	79
		1150	-	64	65	67	68	69	70	73	73
	63	960	-	62	62	63	64	65	66	69	69
	71	1740	9-3	73	75	77	78	79	80	83	84
	_	1450	_	70	70	72	72	75	75	78	78
	_	1150	-	64	64	65	66	68	69	71	72
	100	960	-	61	61	62	62	65	67	67	68

2.3.4 Noise level of gear box (B series) with fan:

			Nois	se level o	of measure	ement sur	face of be	evel gear b	oox with fa	n LPA, U	nit dB
Туре	Ratio	Speed r/min			ı	Foundatio	n numbe	r of gear l	оох		
			04	05	06	07	08	09	10	11	12
	5	1740	80	83	85	87	88	89	91	92	93
		1450	76	79	81	83	84	85	87	88	89
	_	1150	71	73	74	77	78	79	80	82	83
B2	8	960	64	66	67	70	71	72	73	75	76
BZ	9	1740	78	80	81	83	86	87	88	89	90
		1450	73	75	76	78	81	82	83	84	85
	_	1150	67	68	70	73	74	75	77	79	80
	14	960	61	62	64	66	67	68	70	72	73
	16	1740	78	81	83	85	86	87	88	89	91
		1450	72	75	77	79	80	81	82	83	85
	_	1150	65	68	69	71	72	73	74	77	76
	31.5	960	1)	63	64	66	68	69	70	71	73
	35.5	1740	74	77	78	79	80	82	84	87	89
		1450	69	72	73	74	75	77	79	82	84
B3	-	1150	63	65	66	67	69	71	72	73	75
	56	960	1)	1)	1)	62	64	65	67	69	70
	63	1740	73	75	76	78	79	81	83	86	88
		1450	68	70	71	73	74	76	78	81	73
	_	1150	61	63	64	66	68	69	71	73	75
	90	960	1)	1)	1)	61	63	64	66	67	68

Note: 1)LPA < 60dB(A)

2.4 Notes (The following notes are relevant with application of gear box):

- ◆ When installed outdoor, you should avoid direct sunshine, avoid concentrated heat to influence normal performance of the gear box.
- ◆ You should not clean gear box with high pressure device. Inspection, maintenance and installation to gear box should be done when gear box is not working. You should not do welding work on gear box, it can't be used as the joint for welding work. Welding will cause irreparable damage to fine gear wheel and bearings.
- ◆ If there is any abnormal phenomenon during running of the gear box (for example, overheating or abnormal noise, etc), you should cut off driving device immediately.
- ◆ All the rotating components should be equipped with protective cover to prevent accidental contact of staffs, for example, couplings, hydraulic coupler, gear wheel, driving belt wheel, etc.
- ◆ You should conform to the instructions on gear box, for example, nameplate, arrow of the direction, etc. These nameplates and marks should not have dirt and paint on them.
- ◆ During assembling or disassembling work, the damaged bolts should be changed with new bolts with the same strength and category.
- ◆ The bad results caused by unreasonable application of couplings, self-modification to gear box and application of the components of other companies are not included in "three-guarantee" services. According to operation conditions of gear box, the surface, lubrication oil and components of gear box may reach high temperature, avoid being burnt.
- When changing lubrication oil, you should be very careful. Don't be burnt by hot oil.
- ◆ Gear unit should be laid on dry wooden foundation with no vibration and be covered well. When storing gear box and any independent components, you should take anti–rust measures, avoid rusting, the gear box should not be piled together when stored.
- ◆ Unless there are other regulations in ordering contract, gear box should not be stored or work in sites with strong acid, alkali, low temperature, high temperature and heavy polluted air, damp and the places with chemical articles.
- When transporting gear box, you should be very careful, prevent colliding the shaft end, this may cause damage to gear box. When hoisting gear box, you should not install ring bolts on the screw on shaft end.
- The accessories should be bought from BONENG.

3 Installation and disassembly

3.1 Notes before installation



- ◆ Confirm the gear box is not damaged (not damaged during transportation or storage);
- ◆Confirm site environment conforms to nameplate content;
- ◆ Standard ambient temperature of gear box: -20°C~+50°C; no oil, acid, harmful gas, steam, radioactive substances. etc;



- ◆When installed outdoor, avoid direct sunshine, avoid concentrated heat to influence normal performance of gear box;
- ◆Special gear box: allocated according to ambient condition;
- ◆ During planning period, you should reserve enough space to maintain or repair;
- ◆ Gear unit equipped with fan should have enough space to absorb air.

3.2 Preparation work

- ◆ Completely clean the preservative and pollutants, etc on the surface of input shaft and flange surface; pay attention to prevent the immersion of solvents thus damaging oil sealing;
- ◆ If the gear unit is stored for more than one year, the lifespan of lubricant in bearing will shorten;
- ◆ Preparation of tools/materials: one group of spanner, torque spanner, assembly clamp tools, input and output fastening device, lubricant(anti-rust oil), medium of sealing bolts (screw locking agent).

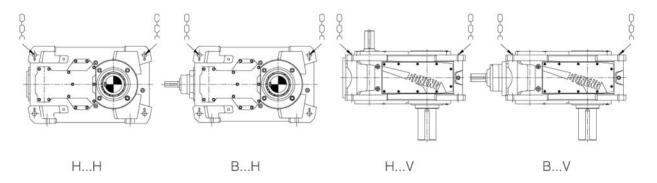
3.3 Installation of gear unit

Foundation

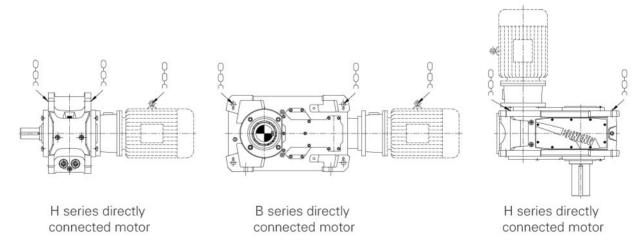
- ◆ Prepare rigid foundation or solid platform to install transmission device, at the same time, you should consider that even with maximum load, the parts position won't change after installation.
- ◆ The foundation of gear box should be horizontal and flat. The design of foundation should ensure no resonance and there won't be any vibration transmitted from the foundation nearby. The foundation rigidity of gear box should be reliable, which is appropriate for weight and torque of gear box and consider about the force exerted on gear box.
- ◆The footing should be installed with hexagon head bolts and nuts, be fastened to regulated torque. We recommend the bolts with strength level of 8.8 or higher strength.

Hoisting position

For the gear box not installed with accessories, you should apply the four boles on gear box to hoist it.



For gear box installed with other accessories (for example motor or foundation), you should add more hoisting points:

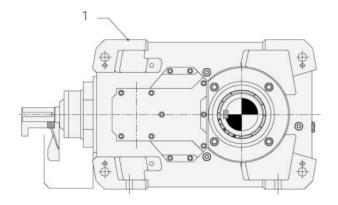


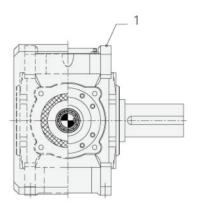


Note: Forbid to use the shaft end screw as the hoisting point after it is installed with hoisting ring.

Installation procedures of gear box:

◆The initial alignment surface (the position marked in diagram) alignment:





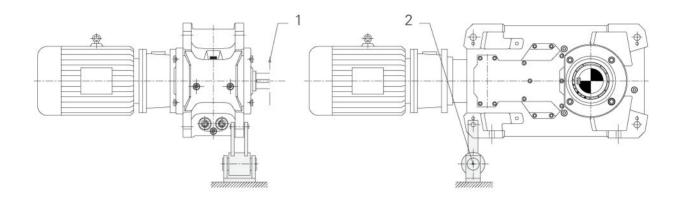
1.Initial alignment surface

- ◆You should ensure fine alignment of axis of input end and output end, this process should be conducted carefully. You can adopt the following methods:
 - Ruler bubble level gauge dial indicator feeler gauge, etc;
- ◆ou can fix the gear box after alignment, then re-check the alignment situation.
 Instruction: the precision degree of alignment is a very important factor to determine lifespan of shaft, bearing, couplings. Ensure the alignment tolerance to be zero.

According to different installation forms, you should pay attention to:

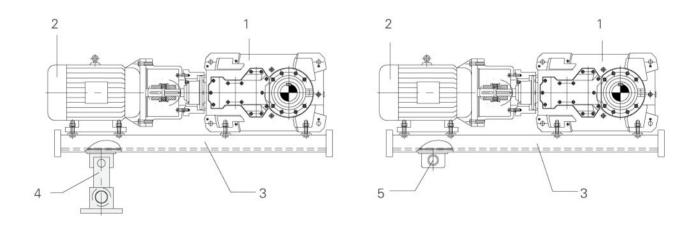
- ◆For foundation installation, the calibration center should be high, when connecting couplings, you should calibrate the coaxiality of the two shafts; for soft couplings, the flotation value should not exceed the allowable range of couplings, for rigid connection, you should ensure form tolerance of each installation and connection; you should ensure shaft with enough rigidity for long shaft connection.
- ◆When installing flange, beading (or concave) should match well, avoid mismatch. For flange installation and hollow shaft connection, ensure the form tolerance for connection.
- ◆When installation of torque arm, hollow shaft should match well with driving shaft of driven device, the floatation or device vibration of driving shaft of driven device should be less than the allowable range of elastic block, the arm should be fixed and be locked. Torque arm should be installed in the gear box side, ensure no force. As showed in diagram:

Torque arm installed on gear box



1. Machine side 2. Flexible support

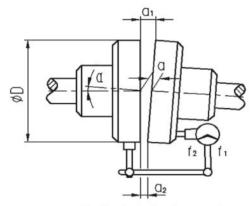
Torque arm installed on foundation of gear box



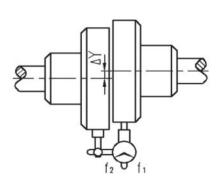
- 1. Gear box 2. Motor 3. Foundation 4. Torque arm 5. Arm support
- ◆When solid shaft is installed with coupling, belt wheel, chain wheel, chain wheel, etc, please don't make heavy clicking. The outer screw hole of output shaft should be pressed into connecting piece. Belt wheel, chain wheel, agitator should consider about radial force.

3.4 Installation of coupling

- ◆ Driving device of input end of gear box should apply flexible coupling or hydraulic coupling.
- ◆When output shaft of gear box is solid shaft, you should apply flexible coupling.
- ◆ If you want to apply rigid coupling or other input and output components that may produce extra radial force or axial force (for example, gear wheel, belt wheel, fly wheel, hydraulic coupling, etc) should be marked in contract.
- ◆When input shaft is connected with driving shaft, ensure input shaft has the same axial center with driving shaft. Coaxiality deviation will increase mechanical vibration, cause damage to bearing and influence gear wheel contact. As is shown in the following diagram, after input shaft is connected with driving shaft through coupling, you should adjust it with meter, after relevant inspection parameter satisfies the requirements in the following table "Coaxiality accuracy table", the equipment can run.



Angle deviation inspection



Deviation inspection

Coaxiality accuracy table:

41.47.0	n<500	Or/min	500 ~ 15	500r/min	>1500r/min		
外径D	a1-a2	ΔΥ	a1-a2	ΔΥ	a1-a2	ΔΥ	
D≤100	0.05	0.05	0.04	0.04	0.03	0.03	
100 <d≤200< td=""><td>0.06</td><td>0.06</td><td>0.05</td><td>0.05</td><td>0.04</td><td>0.04</td></d≤200<>	0.06	0.06	0.05	0.05	0.04	0.04	
200 <d≤400< td=""><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td><td>0.08</td><td>0.06</td></d≤400<>	0.12	0.10	0.10	0.08	0.08	0.06	
400 <d≤800< td=""><td>0.20</td><td>0.16</td><td>0.16</td><td>0.12</td><td>0.12</td><td>0.10</td></d≤800<>	0.20	0.16	0.16	0.12	0.12	0.10	

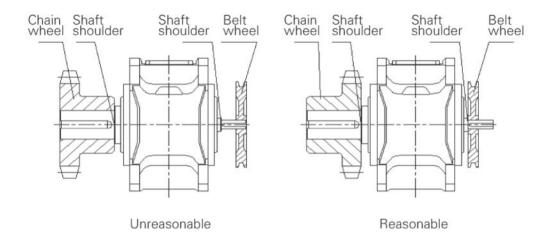


Instruction:

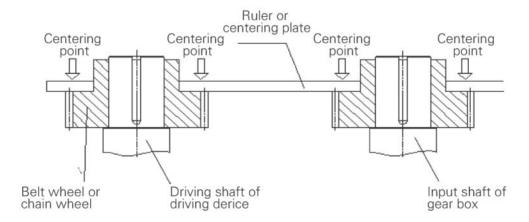
When circular velocity of coupling outer diameter is 30m/s or below, you should do static balancing. When circular velocity of outer diameter exceeds 30m/s, you should do dynamic balancing.

3.5 Installation of belt wheel or chain wheel

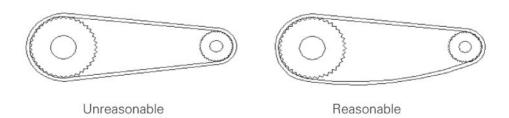
◆When input shaft and output shaft of gear box are installed with belt wheel or chain wheel, you should make the force transmission part of belt wheel or chain wheel be close to shaft shoulder as possible. As is shown in the following diagram:



◆When installing belt wheel or chain wheel, ensure input shaft is centered to driving device, ensure maximum axial deviation tolerance value of the four centering points in diagram be 1mm every 1000mm.

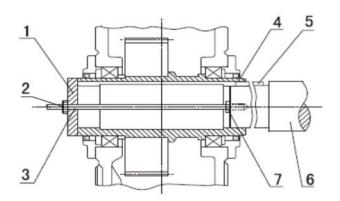


♦When installing belt wheel or chain wheel, ensure belt wheel and chain with certain tension force.



3.6 Installation of hollow shaft of gear box

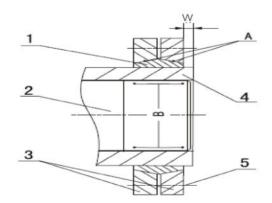
◆ When hollow shaft of gear box is connected with solid shaft of driven equipment, you should clean it and coat anti–rust oil (hollow shaft should be centered). Except the mounting methods of nuts and bolts showed in diagram, you can install with devices of other types, for example, hydraulic lifting device, etc.



- 1 End plate
- 2 Nut
- 3 Bolt
- 4 Hollow shaft
- 5 Parallel key
- 6 Driving shaft of driven device
- 7 Nut
- ◆ When hollow shaft of gear box is equipped with locking plate, you should first cover locking plate on hollow shaft, then finish the installation of driving shaft of driven device, you should not screw the fastening bolts on locking plate before installing the driving shaft of driven device.



→The locking plate being supplied can be directly installed, you can't tear it down before the first stress.
→Before installing locking plate, ensure driving shaft of hollow shaft bole and driven device with no lubrication oil in locking plate region.



- 1Inner ring
- 2Driving shaft of driven device
- 30uter ring
- 4Hollow shaft
- 5Fastering bolt
- AParts with lubriation grease
- BParts can't be with lubrication grease
- W Installation width
- ◆ When screwing the bolts on locking plate, it is forbidden to screw it according to adjacent order, you should screw fastening bolts long with equilateral triangle order according to installation requirements of locking plate. During each circulated screwing process, each bolt can only screw 1/4 circle.

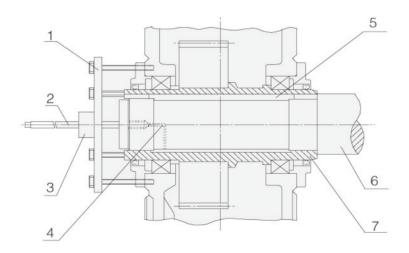
◆The bolts generally applies 8.8 level, if there is high temperature or vibration impact, please take anti-loosing measures on screw joints. The screw torque of each fastening bolt can be seen in the following table:

Bolt dimersion (mm)	Pre-tight torque (N·m)	Bolt dimersion (mm)	Pre-tight torque (N·m)
M6	15	M30	2000
M8	36	M36	3560
M10	72	M42	5720
M12	123	M48	8640
M16	295	M56	13850
M20	580	M64	14300
M24	1000	M72	20800

3.7 Disassembly of hollow shaft of gear box

Disassembly of hollow shaft

According to the device applied, you can get the bolts, central bolts or hydraulic lifting device on end plate off from the driven device. Each end face of hollow shaft are equipped with 2 screw holes to screw in bolts used to fixing end plate.



- 1.Pressure plate
- 2. Bolt
- 3. Hydraulic lifting device
- 4. Hole filled with anti-rust agent

- 5. Parallel key
- 6. Driving shaft of driven device
- 7. Hollow shaft



Note:

Backing plate is not in the range of supply. (Arrangement and dimension of screw hole of hollow shaft end can refer to technical diagram of BONENG)

When disassembling the hollow shaft of gear box equipped with locking plate, the loosing of locking plate is reversed to fastening direction. Finish disassembly of driving shaft of driven device according to the above method after tearing down locking plate.



When disassembling locking plate, you should pay attention:

- →It is forbidden to loose bolts according to the adjacent order.
- →When outer ring of licking plate can't be separate from inner ring, you can screw a few bolts into disassembly screw, separate inner ring from outer ring.

3.8 Installation of accessories

- ◆The technical data of the involved accessories can refer to equipment list of specific order.
- ◆ Electrical and controlling device should be done according to instruction of device supplier.
- ◆ Operation and maintenance should be done according to the regulations in operation instruction provided in order.

Gear box equipped with cooling coil

- ◆ Before connecting cooling coil of cooling water, first take the blocking head off from the joint of cooling coil, completely wash spiral pipe to clean the dirty things.
- ♦ Install inflow and outflow pipe of cooling water, the pressure should not be larger than 0.8MPa.

Gear box equipped with water cooling lubrication oil

- ◆ Before connecting cooling coil of cooling water, the end cap on water pipe should be taken down and wash clean.
- ◆ Install inflow and outflow pipeline of cooling water. For water flow direction and joint position, please consult.
- ◆ Electrically connect heating components.

Gear box equipped with heating device

- ◆ Electrically connect temperature inspection device.
- ◆ Electrically connect heating components.

Gear box equipped with oil temperature measuring device

◆ Electrically connect resistive thermometer and display instrument (be prepared by customers).

Gear box equipped with oil surface height inspection device

◆ Electrically connect oil surface height supervision device.

Gear box equipped with speed sender

Electrically connect speed sender

3.9 Last work

- ◆After installing gear box, you should inspect sealing performance of all the screw joints.
- ◆After screwing down fasteners, you should check whether the alignment changes.
- ◆Inspect whether the removed devices are installed according to device list and the attached diagram.

4 Installation instruction

4.1 H&B installation position instruction

◆ Specific installation direction and selection of gear box can refer to industrial gear box selection manual of BONENG (H&B series).

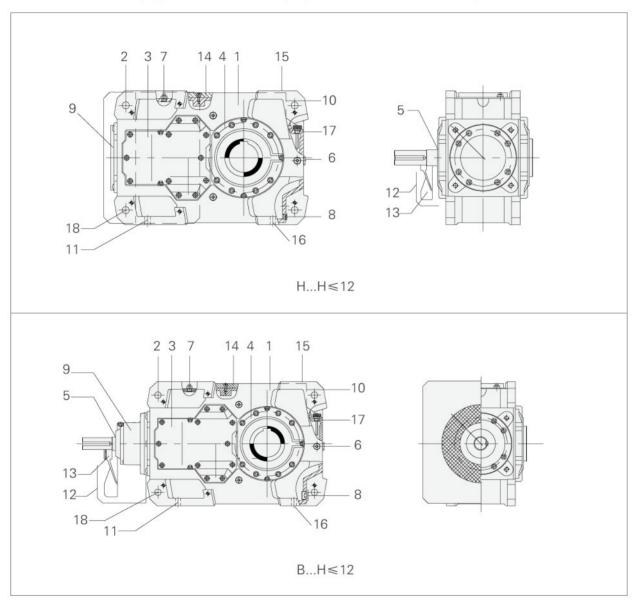
4.2 H&B Installation direction diagram

◆ Symbols used in installation direction pages of gear box and their meanings:

Syml	ool	Mea	ning
		Ventilation cap	Fuel feed hole
6		Oil r	uler
(<u>aī</u>	3	Oil discha	arge hole

4.3 Comprehensive instruction

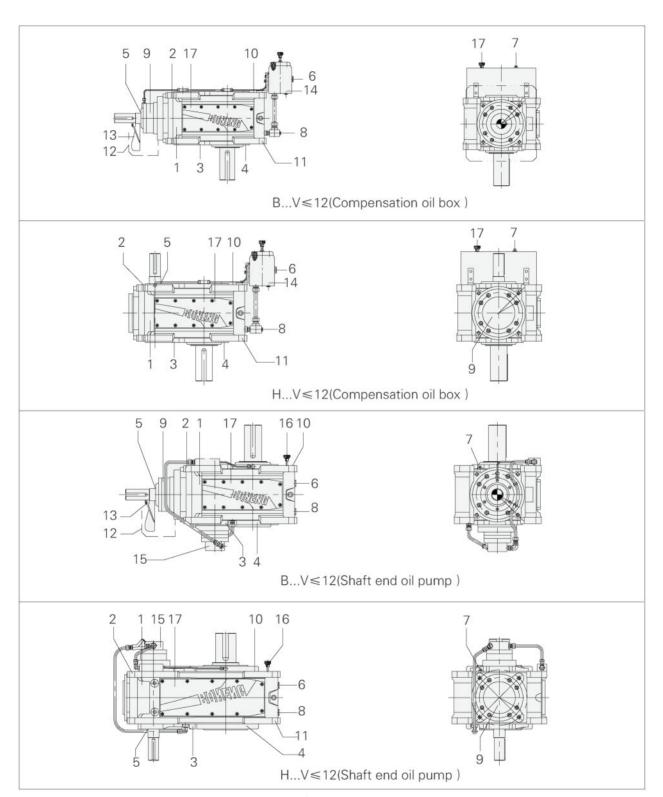
The cabinet is equipped with hoisting screw hole, inspection and assembly cover with appropriate dimensions. The lubrication oil height in gear box can be inspected with inspection oil ruler or observe oil lens. The cabinet is equipped with oil ruler, oil plug, oil lens and a ventilation cap.



- 1 Cabinet body
- 2 Hoisting screw hole
- 3 Cover
- 4 Cover
- 5 Shaft sealing
- 6 Oil lens

- 7 Cabinet ventilation cap
- 8 Oil plug
- 9 Cover or bearing foundation
- 10 Nameplate
- 11 Fastener of gear box
- 12 Fan cover

- 13 Fan
- 14 Inspection or assembly cover
- 15 Alignment face
- 17 Oil filling mouth/oil ruler
- 18 Fastener of torque arm



- 1 Cabinet body
- 2 Hoisting screw hole
- 3 Cover
- 4 Cover
- 5 Shaft sealing
- 6 Oil lens

- 7 Cabinet ventilation cap
- 8 Oil plug
- 9 Cover or bearing foundation
- 10 Nameplate
- 11 Fastener of gear box
- 12 Fan cover

- 13 Fan
- 14 Additional oil box
- 15 Shaft end oil pump
- 16 Oil ruler/oil filling
- 17 Inspection or assembly cover

5 Lubrication/cooling/heating

5.1 lubrication

Selction of lubrication oil:

- ◆ Under the premise of the same viscosity level and category, you can shoose internationally famous brand. If you need to change the recommended viscosity level, please consult.
- ◆The following table lists the lubrication oil brand and ambinent temperature corresponding to product speficiation.

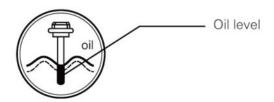
Ambient temperature℃	-20°C ~ +40°C	+30℃~+50℃
Vescosity brand number	VG320	VG460



- ©When ambinetn temperature is lower than −10°C, you have to use synthetic oil.
- ©To ensure lifespan of the products, we recommend synthetic oil.
- When ambinetn temperature exceeds the above range, please consult technical department of BONENG.

Lubrication oil injection quantity:

◆This quantity is a recommended value. According to the difference of gear box level and ratio, the oil filling quantity is different. Please pay attention to oil ruler scale as the indication of oil filling.



- ◆ For the products not set or not installed with oil ruler, oil filling quantity should conform to product sample.
- ◆ For products of the same type, under different installation directions, the oil filling quantity is different.
- ◆ The following table lists suggested oil filling quantity fro different installation directions of various series.

						Oil o	quanti	ty tab	ole (L	_)								
Size	H2H	Н3Н	H4H	B2H	В3Н	B4H	H2	V	НЗ	V	H4	V	В2	V	ВЗ	V	В4	V
Size	1	1	1	1	1	1	2	3	2	3	2	3	2	3	2	3	2	3
04	10	II		10	9	1	25	-	_		aa	S	28		28			j 1
05	15	15	77	16	14	16	23	10	35	13		<u> </u>	41	20	32	12	36	15
06	16	17	=	19	15	18	27	11	37	15	-	9 <u>5-79</u>	50	23	35	13	40	16
07	27	28	25	31	25	30	58	22	60	25	50	20	75	35	52	22	60	30
08	30	30	27	34	28	33	62	25	72	30	60	25	90	38	67	28	70	35
09	42	45	48	48	40	48	100	42	100	40	95	38	115	53	115	48	110	60
10	45	46	50	50	42	50	110	46	110	45	110	45	135	60	125	52	130	67
11	71	85	80	80	66	80	160	60	170	66	165	65	190	86	180	75	180	75
12	76	90	87	95	72	90	180	70	190	75	180	75	215	95	200	85	195	85

①Oil pond splash lubrication; ②Oil immersion lubrication; ③Forced lubrication

Lubrication method

◆Oil immersion lubrication:

When installing gear box vertically, all the gear teeth and bearins are immersed in lubrication oil. When temperature rises and lurbrication grease expands, the space needed is provided by the additional oil box connected with gear box by bolts.

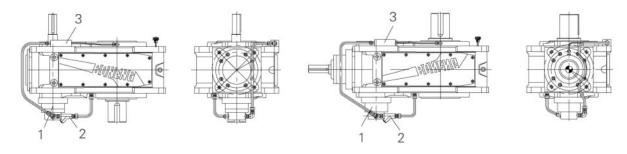
◆Splash lubrication:

When installing gear box horizontally, all the gear teeth and bearings are lubricated by the lubrication oil brought by gears.

For the gear box not with horizontal installation, when the speed of bearing and circumferential velocity of gear rise, splash lurbrication system will be changed into pressure lubrication system or apply auxiliary pressure lubrication system.

◆Lubricaiton system realized by additional devices:

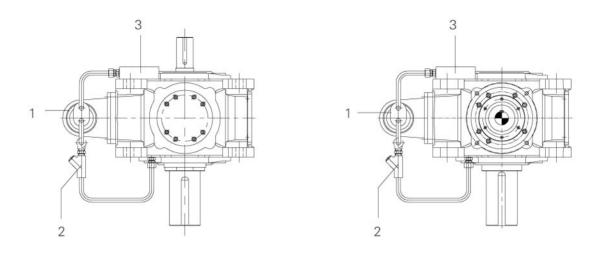
When the speed of bearing or gear wheel line is too high, splash lubrication has to be changed into forced lubrication method. Forced lubrication system includes shaft end pump or motor oil pump, filter, pipeline system. Oil filling of shaft end, hole position of oil discharge are non-relevant with running direction of gear box.



H...V≤12 (Shaft end pump)

B...V≤12 (Shaft end pump)

1 Shaft end pump 2 Filter 3 Oil distributing device



1 Motor oil pump 2 Filter 3 Oil distributing bevice

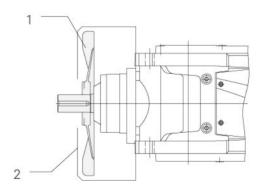


Note: When starting the gear box equipped with motor oil pump, you should first start lubrication oil pump motor.

5.2 Cooling

Fan

Fan isn mounted on a high-speed shaft of gear box, it is protected by protective cover, it won't be touched. This fan absorbs air from the grilling on protective cover, then blow it to the air path on the side of gear box, then part of the heat in gear box can be discharged.



1.Fan

2. Fan protective cover

B...V≤12



Instruction:

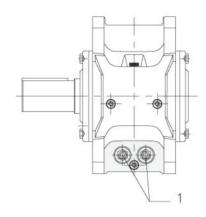
For the gear box installed with fan, you should leave enough space to let air in when installing couplings or other components.

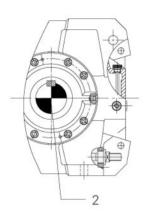
The correct dimension for the space being left is shown the dimension diagram of gear box documents.

Keep the fan clean. If the cabinet of fan or gear box are dirty, cooling effect will be reduced.

Cooling coil cooling

The position of cooling coil is inside the oil box of gear box. The water in cooling spiral pipe is cooling water. Cooling water is provided by users. No matter tap water, seawater or half-salty water can be used for cooling. When cooling water flows through cooling spiral pipe, the heat will be transmited to cooling water from cooling spiral pipe, thus removing heat from the system.





B../H..≤12

1.Cooling water joint 2.Output shaft

_		Flow of the cooling water (I/min)										
Type	04	05	06	07	08	09	10	11	12			
H2H	4	4	4	4	4	8	8	8	8			
H2V	-	-	-	-	-	-		-	-			
H3H	-	4	4	4	4	4	4	8	8			
H3V	-	-	-	-	-	-	-	-	-			
B2H	4	8	8	8	4	8	8	8	8			
B2V	-	-	-	_	-	-	-	-	-			
B3H	4	4	4	4	4	8	8	8	8			
B3V	-	-	-	-	-	-		-	-			

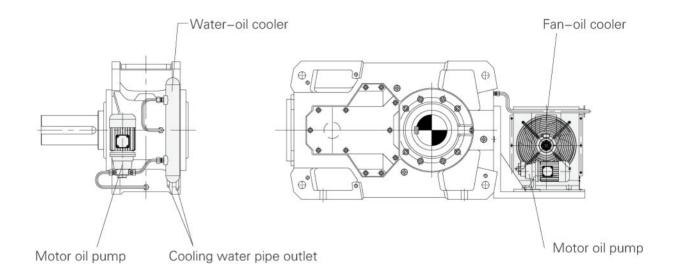
Note:



Cooling water can flow through gear box from any direction. The pressure of cooling water should not exceed 0.8MPa. If the gear box is stored for a long time, the water may freeze, so the cooling water should be discarged. Blow moisture with compressed air. The end of cooling spiral pipe should not be distorted, otherwise the spiral pipe will be damaged. Locking screw can't be screwed or be torn down, otherwise the cooling spiral pipe will be damaged.

Cooling of cooling device

Gear box with cooling device is cooled with lubrication oil, thus completing heat dissipation. Common cooling device: air cooling device and water cooling device, as shown in the diagram:



Air cooling device utilizes the surrounding air to cool, according to the difference of flow quantity, lubrication oil flows through cooling device from one path or several paths, air blows through these paths from fan, getting cooling effect.

Instruction:

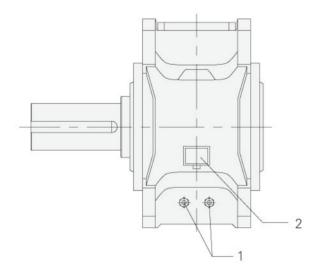


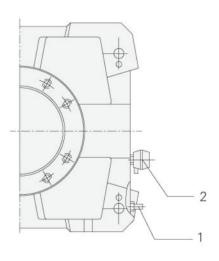
For the gear box equipped with air cooling device, you ensure ensure the air circulation from being impeded. The minimum distance from adjacent compoentns and walls can be seen in diagrams in gear box documents.

◆ The principle of water cooling device is the same with air cooling device, the medium of cooling is changed from air into water. To ensure the best cooling effect, you should conform to the flow direction of cooling device. The inlet and outlet of cooling water should not be changed. Cooling water pressure should not exceed 0.8MPa. If the gear box is stopped for a long time, or the water freezes, you should discharge cooling water. You should blow moisture with compressed air.

5.3 Heating

Under low temperature, you may be required to heat the lubrication oil in gear box before starting the driving device of gear box. Sometimes, you even need to heat the lubrication oil during operation. Under these situations, you should equip one or two heating components. These heating components transfers electric energy into heat energy, thus hearing the lubrication oil. Heating component is laid in protective cover pipe, then be put into gear box cabinet, so you don't need to discharge lubrication oil in gear box cabinet when changing heating component.





H.../B...≤12

1 Heating component

2 Temperature inspection device

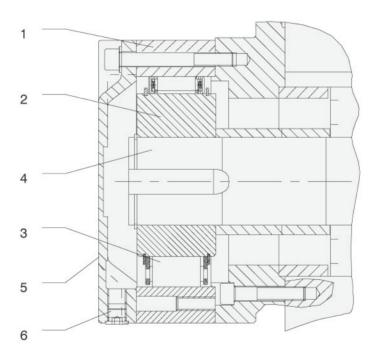




You can only connect power source of heating component when it is immersed in lubrication oil, otherwise, there may be fire danger. If you install heating component in the future, the maximum hearing capacity on the surface of heating component should not exceed 0.8W/cm².

5.4 Baxkstop mechanism

In some situations, the gear box should equip mechanical backstop mechanism. This can make gear box run to one direction during the running process. The rotation direction is marked in input and output end of gear box with arrow. Backstop mechanism is installed on mounting flange plate of gear box, it is sealed, with no oil leakage. It is united with lubrication oil circulation system.



- 1. External circle of backstop device
- 2. Internal circle of backstop device
- 3. Backstop frame and derice
- 4. Shaft (install flange plate)
- 5. cover
- 6. Discharge hole of residual oil of backstop device



Note:

To avoid damaginf backstop device or gear box, the motor should not run to the forbidden direction, pay attention to the instruction on gear box. Before motor wiring, you should determine rotation direction of three-phase power source with phase order indicator, connect motor wire according to the regulated rotation direction.

6 Application

6.1 Filling of lubrication oil

◆Our products are not filled with lubrication oil when delivered. You should fill lubrication oil according to instruction book before running.



On the position marked with this symbol, fill lubrication oil into gear box.

6.2 Device check

- ◆ Check oil level, cooling of lubrication oil or the sealingness of oil supply system pipeline.
- ◆Inspect the status of cooling device and check valve.
- ◆For the gear unit equipped with backstop device, inspect whether wiring of motor is correct.
- ◆Inspect whether shaft sealing is effective.
- ◆ Check whether the rotating components contact with other components.

6.3 Starting

- ◆ For the gear box equipped with motor oil pump, first open oil pump motor before starting the device.
- ◆ Check whether the running direction under free status is correct (supervise whether there is abnormal grinding noise when the shaft is running).
- ◆ During running inspection, you should ensure no output component on shaft, open relevant supervision and protection device at the same time.
- ◆ If there is abnormal running phenomenon (for example, temperature rise, noise, vibration, etc), you should turn off the motor and check out the reason.
- ◆ Contact with BONENG when necessary.

7 Inspection and maintenance

7.1 Regular check and maintenance

◆Users should make regular maintenance to gear box. You should check the status of lubrication oil regularly, clean ventilation cap, fan, cooling coil and dirt and impurities on the surface of gear box, keep the gear box clean, ensure normal running of gear box.

7.2 Cycle of inspection and maintenance

Check oil temperature	Every day
Check abnormal noise of gear box	Every day
Check oil height	Every month
Check oil leakage of gear box	Every month
Check moisture in oil	Afetr working 400 hours, at least once a year
First oil changing after starting	After working 400 hours
Oil changing after it	After every 5000 hours
Clean oil filter	Every 3 months
Clean ventilation cap	Every 3 months
Clean fan, fan cover and gear box cabinet	Do with oil changing
Check the accumulated articles in cooling spiral pipe	About every 2 years, do with oil changing
Check lubrication oil air cooler	Do with oil changing
Check lubrication oil water cooler	Do with oil changing
Check the fastening degree of fastening bolts	The first time after changing oi, then change oil every two times
Full-aspect inspection to gear box	About every 2 year, do with oil changing
Clean ventilation screw	Every 3 months



The listed cycles are determined on working condition of gar box. These cycles are average values under the following conditions:

- →Daily working hour: 24 hours
- →Loading coefficient: 100%
- →Speed of input device 1800 RPM
- →Maximum temperature 90°C (only mineral oil)
- →100°C (only synthetic oil)

7.3 Notes for inspection and maintenance:

- ◆ Cut off power source, prevent electric shock, wait for cooling of gear box.
- ◆Inspection of oil level: screw down oil ruler, inspect oil level.
- ◆ Oil inspection: remove oil plug, take oil sample, inpsect oil viscosity index; if the oil is not clean, change it.
- ♦Oil changing:
 - →It is forbidden to mix different lubricants.
 - →After cooling, oil viscosity will increase, it is harder to discharge oil. So the gear box should be kept warm.
 - →Put an oil picking plate under oil plug, tear down oil plug/oil ruler/ventilation cap, install oil plug after removing oil.
 - →Inject new oil of the same brand, oil quantity should be the same with installation direction (see nameplate); if the brand number is different, consult after-sales department.
 - →Inspect oil level at oil ruler, install oil ruler and ventilation cap.

8 Fault treatment

8.1 Fault, reason and measures

Maintenance work should be done by qualified staffs.

Fault	Reason	Measure
Big noise at the fastener of gear box	Fastner looses	Screw bolt/nut to regulated torque. Change the damaged bolt/nut.
Noise change of gear box	Gear of gear box is damaged	Contact with customer service department. → Check all the gears, change the damaged components.
	Bearing interval is too large	Contact wth customer service department →Adjust bearing interval.
	Bearing is damaged	Contact with customer service department. →Change the damaged bearings.
	Oil level in cabinet is too high.	Check oil level, if necessary, adjust it.
Working temperature is too high	Oil is too old.	Contact with customer service department. →Check the last time of oil changing, if necessary, change it.
	Oil is seriously polluted.	Contact with customer service department →Change oil
	On gear box equipped with lubrication oil cooling system: Flow of coolant is too low or too high	Adjust the valve of inflow and outflow pipelines. Check free flow of water cooling device.
	Temperature of coolant is too high	Check the temperature and adjust according to requirements
	Oil flows through water cooling device is too low, reason" Oil filter is seriously blocked	Clean oil filter
	Mechanical fault of oil pump	Contact with customer service department. →Check whether the function of oil pump is normal. →Rest or change into a new one.
	On gear box equipped with fan: Air inlet and/or cabinet of fan cover are seriously polluted	Clean fan cover and cabinet
	Gear box equipped with cooling coil: Accumulated dirt in cooling coil	Contact with customer service department. →Clean or change cooling coil.

Fault	Reason	Measure	
Temperature of bearing is too high	Oil level in gear box cabinet is too high or too low	Check oil level under room temperature and fill oil according to requirements	
	Oil is too old	Contact with customer service department. →Check the last time of oil changing.	
	Mechanical fault of oil pump	Contact with customer service department. →Check whether oil pump works normally. Repair or change a new oil pump	
	Bearing is damaged	Contact with customer service department. → Check the data obtained from vibration measurement by operators → Check and change bearing according to requirements	
Amplitude of bearing rises	Bearing is damaged	Contact with customer service department → Check and change bearing according to requirements.	
	Gear is damaged	Contact with customer service department, →Check and change gear according to requirements.	
Temperature of backstop device is too high Backstop is ineffective.	Backstop device is damaged.	Contact with customer service department. →Check and change backstop device according to requirements.	
Gear cabinet leaks oil	Sealing at cabinet cover or joint is not good	Check sealing part and the joint, if necessary, change into a new one. Seal the joint part.	
	Radial shaft sealing ring is ineffective.	Contact with customer service department. →Change into a new radial sealing.	
There is water in oil	Impurities in water	Check whether there is water in oil with test tube. Analyze oil in lab.	
	Lubrication oil cooler or cooling coil is ineffective	Contact with customer service department. →Find out and repair the leaking part. →Change cooler or cooling coil.	
	Gear box occurs the cold air from ventilation, thus forming frost.	Protect the gear box with appropriate thermal insulation material. Close air outlet or change its direction on structure	
Pressure supervision device alarms (gear box equipped with pressure lubrication, lubrication oil water cooling device and air cooling device)	Oil pressure is less than 0.5bar	Check oil height under room temperature, fill in oil according to requirements. Check oil filter, change according to requirements. Contact with customer service department. → Check whether oil pump function is normal. → Repair or change oil pump.	
Indicator of double changing filter sends alarms	Double changing filter blocks	Change the filter according to instructions, take the blocked filter core down and clean it.	
Fault of oil supply system		Check the instructions of oil supply system in instruction book.	

For the faults can't be removed by customers, please contact with after–sales department of the company.

10 After-sales service

For the various kinds of transmission devices, if there is any quality problem, don't tear down components, you should illustrate the situation, then contact with after-sales department of the compant, confirm about the problems, then apply ideal method to deal with them.

Type:		
Delivery date:		
Number:		
Time being used:		
Site or main machine name:		
Manufacturer of main machine:		
Quality problem description:		
User company:		
Address:		
Telephone:	Fax:	
Postcode:	Contact:	
After–sales service telephone of Boneng:	Fax:	
,		
NOTE:		
,		

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