



HE - KH- MHE - KHE
Operating Manual

ZET
Gearboxes

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Important Warnings



It is a must to follow the instructions in this manual to benefit the warranty cover and for a problem-free operation. On that account, this manual must be read carefully.

Keep the operating manual somewhere close to the gearbox since it includes important information about services.

The Description of Gear-Boxes

The gearbox type is defined by a code including eight parts which are gearbox service, stage, exchange ratio, input and output options, assembling options, diameter of flange and engine dimension.

1 2 3 4 5 6

MHE	2063	6,41	A	SD	M3	F350D	132S4B5
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1 Series of Gear Unit

HE	Parallel Shaft Gear Reducer
MHE	Parallel Shaft Gear Reducer with Motor
KH	Bevel Helical-Rightangle Shaft Gear Reducer
MKH	Bevel Helical-Rightangle Shaft Gear Reducer with Motor


2 Number of Stage

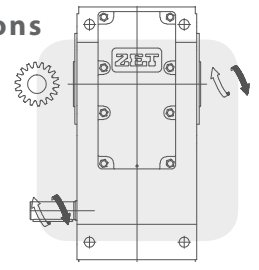
1	Single Stage	063
		080
		100
2	Two-Stage	125
		140
		160
3	Three-Stage	180
		200
		225

3 Reduction Ratio

$$2,5 < i < 130$$

4 Input Shaft Configurations

A	 ZET Gearboxes April 2010 Catalogue Dimention Tables
L	
D	



The symbol indicates the direction of shaft rotation.



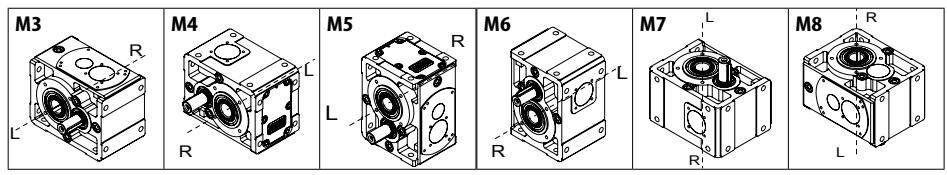
The symbol indicates where the output wheel is located.

5 Output Configurations

The option is defined only with two letters. Such as **SL**, **SD** of **HS**

D	Solid Shaft	L	Left
HS	Hollow Shaft	R	Right
S	Shrink Disk	D	Double

6 Mounting Positions



Causes and the Corrective Actions

TROUBLE	POSSIBLE CAUSES	CORRECTIVE ACTIONS
Continuous different spinning sound	<ol style="list-style-type: none"> 1. Abrasion Sound (Damage in bearings) 2. Knocking Sound (Abnormal situation in Gears) 	<ol style="list-style-type: none"> 1. Check the oil and change the bearings. 2. Consult ZET Gearboxes.
Continuously changing abnormal spinning sound	Foreign substance in oil	<ol style="list-style-type: none"> 1. Check the oil level. 2. Consult ZET Gearboxes.
Overheat	<ol style="list-style-type: none"> 1. Much or less oil amount 2. Inappropriate Oil 3. Conical roller bearings are too tight 4. Overheated environment 5. The negative effect of the Sun light 	<ol style="list-style-type: none"> 1. Check the oil level. 2. Control the values like viscosity of oil 3. Check the gaps the bearings. 4. Use extra cooling systems. 5. Protect the gearbox against the Sun light.
Oil leak	<ol style="list-style-type: none"> 1. Leak at the gearbox lid 2. Damage at the felt 3. High pressure in the gearbox. 	<ol style="list-style-type: none"> 1. Compress the lid bolts of the gearbox and watch the gearbox for a while. If the problem continues consult ZET Gearboxes. 2. Change the felt 3. Clean the ventilation
Leak at the ventilation	<ol style="list-style-type: none"> 1. There is much oil 2. Wrong gearbox assembly position 3. Çok sık soğuk kalkış yağ köpürtüyor 	<ol style="list-style-type: none"> 1. Correct/ rearrange the oil level. 2. Change the assembly position or ventilation position 3. Consult ZET Gearboxes.
The output shaft doesn't work although the motor works.	Problem at gearbox shaft göbek bağlantısı	Consult ZET Gearboxes.

7 Flange Diameter and Directions

F	Flange Diameter	L	Left
		R	Right
		D	Double

8 Motor Size

If the motor is not supplied by ZET Gearboxes, the value of the motor flange diameter and the input shaft diameter should be specified in this section.



Definition of Label



This label defines our product. Owing to this, the labels must not be removed and they must be damage-free and legible.

All of the information on the label must be indicated by the customer during the later order of the spare parts.

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Tip : <input style="width: 100%;" type="text"/> <input style="width: 100%;" type="text"/> i : <input style="width: 50%;" type="text"/> n ₂ : <input style="width: 50%;" type="text"/> Seri No : <input style="width: 100%;" type="text"/> M.Poz. : <input style="width: 100%;" type="text"/>	P ₁ : <input style="width: 50%;" type="text"/> kW Motor : <input style="width: 100%;" type="text"/> Ø : <input style="width: 100%;" type="text"/> fs : <input style="width: 100%;" type="text"/> P N2 (1400) : <input style="width: 50%;" type="text"/>
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Safety Warnings



The warnings in this manual are just for the gearboxes. When gearboxes with motor are used, the manual for gearboxes with motor should be considered, too.

Gearboxes and gearboxes with motor could be under pressure while they are operating and the parts could be movable and overheated.

The shipping, storing, assembling, start-up, maintenance and repair must be done by only the professional staff. During these actions;

- The operating manuals must be examined deeply.
- The labels on the gearboxes and the gearboxes with motor must be taken into careful consideration.
- The needs related to the system and drive type
- Special attention must be given to the legal regulations and rules.

In the conditions listed below there is a high risk of financial damage and deadly harm.

- The misuse of the product
- The wrong assembling and operation
- The usage without grease
- The usage out of the product manual/label rates.

The Operating Conditions



The gearboxes and the gearboxes with motor are designed to be used in the industrial machines. They must be used under the conditions mentioned on the product label and in this manual.

- The temperature +0, ... , +40 °C
- The altitude max. 1000m
- It cannot be used if there is the possibility of explosion.

Delivery

When the customer receives the product, it must be checked whether the product has all the technical properties as ordered and it gets damaged during the shipping or not. In the event of a damage it must be reported to the shipper.

Storing



Gearboxes and gearboxes with motor could be stored for two years under the conditions listed below.

- The store must be clean, dry and vibration free.
- The temperature must be between 0 - (+40) °C
- The gearboxes must be kept in the assembling position.
- Shafts and processed surfaces must be greased and rust preventative maintenance must be applied.
- The shafts must be rotated several times once every six months in order to protect the bearing and the felt.

Mounting

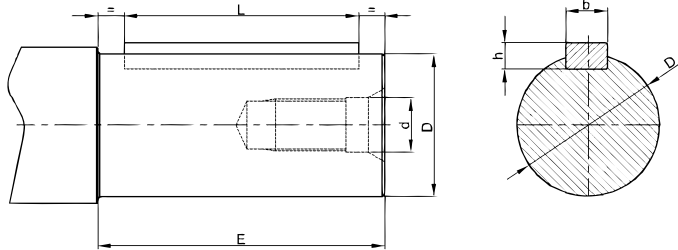


Before the assembly the points listed below must be primarily checked.

- Whether a damage occurred during shipping and storage or not.
- Whether the temperature and the existing environment conditions such as temperature, humidity, air are suitable or not.
- Whether the work conditions are suitable with the label.
- Whether the assembling conditions are suitable with the label.
- Whether it is greased at the accurate rate.

Gearbox Input Shaft

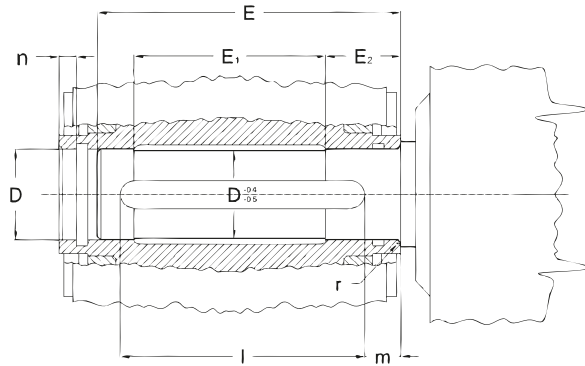
Gearbox input shaft diameters, shaft lengths, and wedge dimensions are shown in the chart below.



D	E	d	Wedge (b x h)
11 [j6]	23	M4x10	4x4x18
14 [j6]	30	M5x14	5x5x25
16 [j6]	30	M5x14	5x5x25
19 [j6]	40	M8x18	6x6x36
24 [j6]	50	M8x20	8x7x45
28 [j6]	60	M10x25	8x7x45
32 [k6]	80	M12x30	10x8x70
38 [k6]	80	M12x30	10x8x70
42 [k6]	110	M16x38	12x8x90
48 [k6]	110	M16x38	14x9x90
55 [m6]	110	M20x44	16x10x90
60 [m6]	140	M20x44	18x11x110
70 [m6]	140	M20x40	20x12x125
75 [m6]	140	M20x40	20x12x125

Gearbox Output Shaft

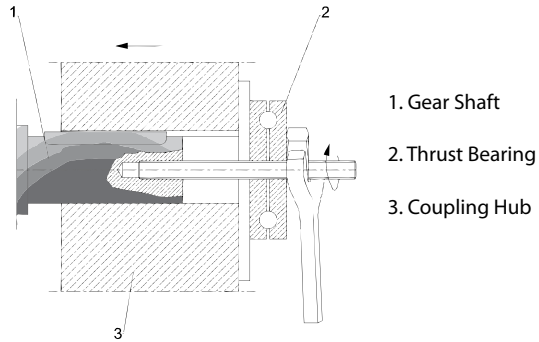
Gearboxes could have solid shafts, hollow shafts and shrink discs. The dimensions of the gearboxes with hollow shafts and the proposed shaft dimensions are shown in the chart below.



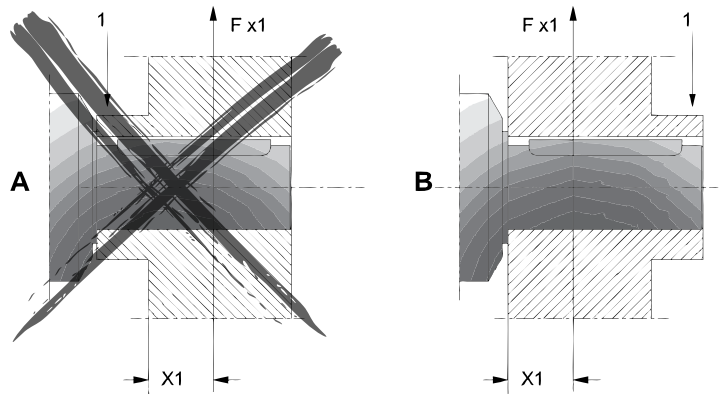
HOUSING SIZE	D Ø H7,j6,k6	E	E ₁	E ₂	l	m	n	r
63	30	113	51	42	70	30	-	1,5
80	38	150	80	42	105	30	6	1,5
100	48	180	90	50	125	35	7	2
125	60	210	105	60	150	40	7	2
140	70	210	80	75	150	35	8	2
160	80	260	130	78	200	36	8	3
180	90	275	140	80	200	50	9	3
200	100	295	170	82	220	42	10	3
225	110	310	150	92	225	55	10	3,5

Input and Output Parts/ Component

It is shown below how to assemble the conductive drive components to the input/output shafts of the gearboxes.



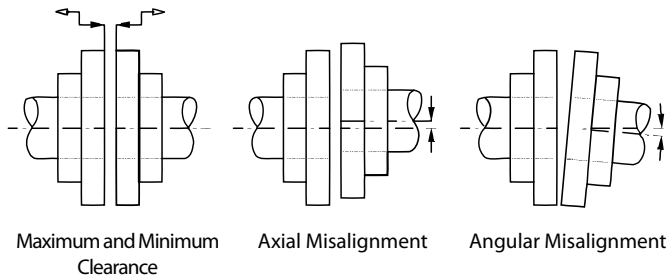
Not to form high radial and axial mass, this conductive drive components must be assembled adjacent to the gearbox.



- The assembly of the drive components must be done using only pull appliance.
- The balancing wheels, couplings, pinions must not be assembled by hitting the edge of the shaft with a hammer. This could cause harm in the bearing, body and the shaft.
- Special attention must be paid to the accuracy of the tension of the belt pulley
- Balance adjustments of the drive components must be done after they are assembled.
- To grease the components which are going to be assembled or to heat the drive components (80- 100 °C) ease the assembly.

Mounting of Coupling

While the couplings are being assembled their balance ratio must be taken and maximum minimum distance, axial slip and angular slip rates must not be higher than the allowed rates.



Checking and Maintenance



After each 3000 work hours, at least once every six months, check

- The grease bowls,
- The oil level,

At the very latest, once every 3 years, change

- The mineral oil,
- Bearing grease,









At the very latest, once every five years,

- Change the synthetic oil,
- Change the felt,
- Change the bearings,
- Check the sound change.

According to the gearbox gear heat, the range of the time for oil change is indicated in the chart below.

OIL TEMPERATURE	OIL - CHANGE INTERVAL	
	MINERAL OIL	SYNTHETIC OIL
$T \leq 65 \text{ }^{\circ}\text{C}$	8.000	25.000
$65 < T \leq 80 \text{ }^{\circ}\text{C}$	4.000	18.000
$80 < T \leq 95 \text{ }^{\circ}\text{C}$	2.000	12.500
$95 < T \leq 110 \text{ }^{\circ}\text{C}$	-	9.000

The oil options that ZET Gearboxes is given in the chart below.

LUBRICANT	ISO VISCOSITY								
MINERAL OIL	Iso VG 680	Degol BG 680	Energol GR XP680	Spartan EP 680	GEM 1 680	Mobilgear 636	Omala 680	Alpha SP 680	Gravis SP 680
	Iso VG 460	Degol BG 460	Energol GR XP460	Spartan EP 460	GEM 1 460	Mobilgear 634	Omala 460	Alpha SP 460	Gravis SP 460
	Iso VG 320	Degol BG 320	Energol GR XP320	Spartan EP 320	GEM 1 320	Mobilgear 632	Omala 320	Alpha SP 320	Gravis SP 320
	Iso VG 220	Degol BG 220	Energol GR XP220	Spartan EP 220	GEM 1 220	Mobilgear 630	Omala 220	Alpha SP 220	Gravis SP 220
	Iso VG 150	Degol BG 150	Energol GR XP150	Spartan EP 150	GEM 1 150	Mobilgear 629	Omala 150	Alpha SP 150	Gravis SP 150
	Iso VG 100	Degol BG 100	Energol GR XP100	Spartan EP 100	GEM 1 100	Mobilgear 627	Omala 100	Alpha SP 100	Gravis SP 100
SYNTHETIC OIL	Iso VG 680	Degol GS 680	Enersyn GR XP680	-	Syntheso D 680 EP	Gygoyle HE 680	-	-	Gravis MP 680
	Iso VG 460	Degol GS 460	Enersyn GR XP460	Glycolube 460	Syntheso D 460 EP	Gygoyle HE 460	Tivela SD	Alphasyn PG 460	Gravis MP 460
	Iso VG 320	Degol GS 320	Enersyn GR XP320	Glycolube 320	Syntheso D 320 EP	Gygoyle HE 320	-	Alphasyn PG 320	Gravis MP 320
	Iso VG 220	Degol GS 220	Enersyn GR XP220	-	Syntheso D 220 EP	Gygoyle HE 220	Tivela WB	Alphasyn PG 220	Gravis MP 220
	Iso VG 150	Degol GS 150	Enersyn GR XP150	-	Syntheso D 150 EP	-	-	Alphasyn PG 150	Gravis MP 150
	Iso VG 100	-	Enersyn GR XP100	-	Syntheso D 100 EP	-	-	-	Gravis MP 100

During the oil change, the noteworthy points are;



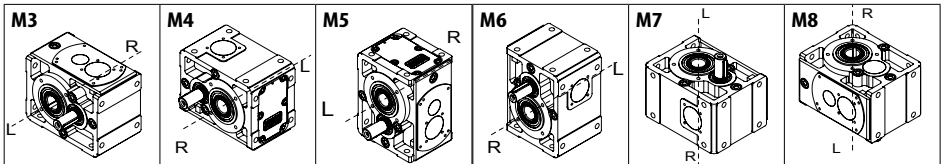
- Synthetic oil and mineral oil must not be mixed.
- Intensive contact with oil can cause skin irritation. Avoid intense contact and clean the oil smudged.
- Hot oil can cause burns. During the oil change do not touch the oil or use protective appliances.

The Amount of Lubricant

The amount of grease needed to be applied to the gearbox varies according to the assembly position.

In the chart below, according to the assembly positions coded in chart 3 the amount of grease is given in terms of liter.

Mounting Positions



GEARBOX	LUBRICANT FILL QUANTITIES BY MOUNTING POSITION (LT)					
	M3	M4	M5	M6	M7	M8
1063	0,8	0,8	0,9	1,1	1,1	1,1
2063	1,0	1,0	1,3	1,5	1,3	1,3
3063	1,1	1,1	1,4	1,7	1,4	1,4
1080	1,3	1,3	1,7	2,1	2,1	2,1
2080	1,7	1,7	2,5	3,0	2,5	2,5
3080	1,9	1,9	2,8	3,2	2,8	2,8
1100	2,3	2,3	2,9	4,0	4,0	4,0
2100	3,2	3,2	5,0	5,8	5,0	5,0
3100	3,5	3,5	5,5	6,3	5,5	5,5
1125	4,7	4,7	6,2	6,9	6,9	6,9
2125	6,2	6,2	8,8	10,5	8,8	8,8
3125	6,7	6,7	11,2	9,7	9,7	9,7
1140	7,4	5,3	8,6	9,7	9,7	9,7
2140	6,5	6,5	10,0	11,0	10,0	10,0
3140	6,5	10,5	10,5	10,5	10,5	10,5
1160	8,8	8,8	11,7	13,0	13,0	13,0
2160	11,0	11,0	17,5	20,0	17,5	17,5
3160	11,0	18,0	18,0	18,0	18,0	18,0
1180	14,1	9,9	16,3	18,2	18,2	18,2
2180	12,0	12,0	21,0	19,0	19,0	19,0

GEARBOX	LUBRICANT FILL QUANTITIES BY MOUNTING POSITION (LT)					
	M3	M4	M5	M6	M7	M8
3180	12,0	19,0	19,0	19,0	19,0	19,0
1200	16,5	16,5	22,0	25,0	25,0	25,0
2200	21,0	21,0	33,0	38,0	33,0	33,0
3200	21,0	33,0	33,0	33,0	33,0	33,0
1225	26,5	19,0	30,0	35,0	35,0	35,0
2225	22,0	22,0	35,0	39,0	35,0	35,0
3225	22,0	35,0	35,0	35,0	35,0	35,0
2063	1,0	1,0	1,3	1,3	1,3	1,3
3063	1,1	1,1	1,4	1,7	1,4	1,4
2080	1,7	1,7	2,5	2,5	2,5	2,5
3080	1,9	1,9	2,8	3,2	2,8	2,8
2100	3,2	3,2	5,0	5,0	5,0	5,0
3100	3,6	3,6	5,5	6,5	5,5	5,5
2125	6,2	6,2	9,0	9,0	9,0	9,0
3125	6,7	6,7	9,7	11,2	9,7	9,7
2140	6,6	6,6	10,5	10,5	10,5	10,5
3140	6,6	10,5	10,5	10,5	10,5	10,5
2160	11,0	11,0	17,5	17,5	17,5	17,5
3160	11,0	17,5	17,5	17,5	17,5	17,5
2180	12,0	12,0	19,0	19,0	19,0	19,0

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GEARBOX		UBRICANT FILL QUANTITIES BY MOUNTING POSITION (LT)					
		M3	M4	M5	M6	M7	M8
MHE	3180	12,0	19,0	19,0	19,0	19,0	19,0
	2200	21,0	21,0	33,0	33,0	33,0	33,0
	3200	21,0	33,0	33,0	33,0	33,0	33,0
	2225	22,0	22,0	35,0	35,0	35,0	35,0
	3225	22,0	35,0	35,0	35,0	35,0	35,0
KH	2063	0,9	1,1	0,9	0,9	1,0	1,0
	3063	1,1	1,3	1,1	1,8	1,3	1,3
	2080	1,5	2,2	1,5	1,5	2,0	2,0
	3080	1,7	2,4	1,7	3,0	2,2	2,2
	2100	2,8	4,0	3,2	3,2	3,4	3,4
	3100	3,2	4,5	3,2	6,0	4,1	4,1
	2125	4,7	4,7	6,1	7,0	7,0	7,0
	2140	5,2	5,2	8,5	9,0	9,0	9,0
	3140	6,6	6,6	10,5	12,0	10,5	10,5
	2160	9,0	9,0	11,5	13,5	13,5	13,5
	3160	11,0	11,0	17,5	20,0	17,6	17,6
	2180	10,0	10,0	15,0	22,0	22,0	22,0
	3180	12,0	12,0	19,0	20,0	19,0	19,0
	2200	16,5	16,5	22,0	25,0	25,0	25,0
	3200	21,0	21,0	33,0	38,0	33,0	33,0
	3225	22,0	22,0	35,0	40,0	35,0	35,0

GEARBOX		UBRICANT FILL QUANTITIES BY MOUNTING POSITION (LT)					
		M3	M4	M5	M6	M7	M8
MKH	2063	1,0	1,1	1,0	1,0	1,1	1,1
	3063	1,1	1,3	1,1	1,8	1,3	1,3
	2080	1,4	2,2	1,4	1,4	2,0	2,0
	3080	1,8	2,4	1,8	3,0	2,2	2,2
	2100	2,9	4,2	3,2	3,2	3,9	3,9
	3100	3,3	4,6	3,3	6,4	4,2	4,2
	2125	4,7	4,7	6,1	7,0	7,0	7,0
	2140	5,5	5,5	7,5	8,5	8,5	8,5
	3140	6,6	6,6	11,0	13,0	11,0	11,0
	2160	8,9	8,9	12,0	13,2	13,2	13,2
	3160	11,0	11,0	17,5	20,0	17,5	17,5
	2180	10,0	10,0	16,3	18,0	18,0	18,0
	3180	12,0	12,0	19,0	21,0	19,0	19,0
	2200	16,5	16,5	22,0	25,0	25,0	25,0
	3200	21,0	21,0	33,0	38,0	33,0	33,0
3225	22,0	22,0	35,0	40,0	35,0	35,0	

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