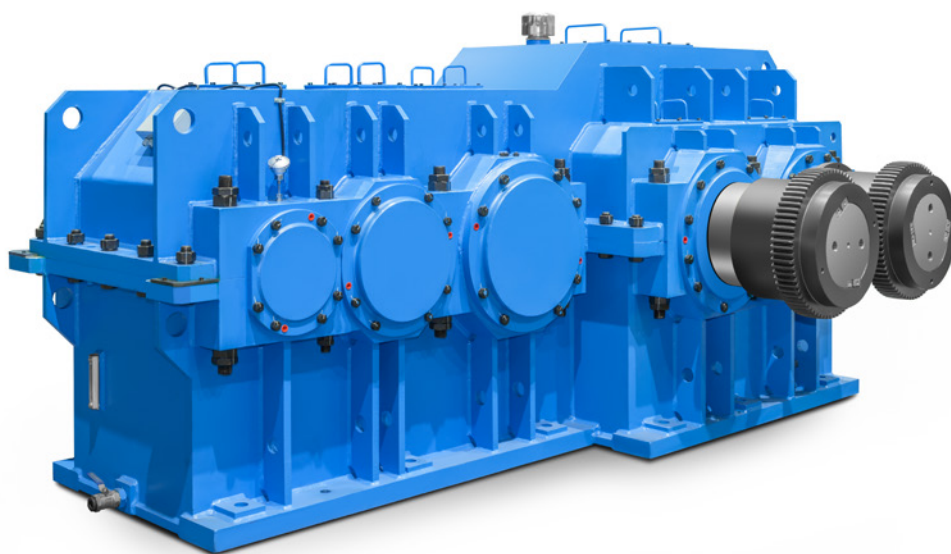


DONLY TRANSMISSION



东力齿轮箱

橡胶机械齿轮箱

GEAR UNITS FOR RUBBER MACHINERY

型号 Type DLDYJ/DLPSY/DLJ/DLM/DLKL

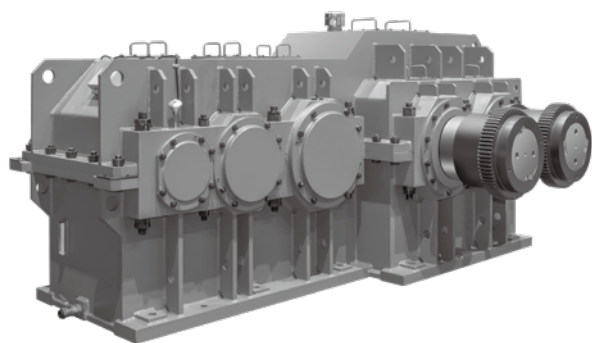
版本 Edition 2021

DONLY

驱 动 无 限 可 能

橡胶机械减速机

**Gear Units For
Rubber Mechanical**



DONLY

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产品介绍

Production Introduction

1.1 概述

橡塑用主齿轮箱是在充分吸收了国外先进技术的基础上，结合本公司经验和特点，开发设计的新型橡胶塑料重载齿轮箱。它采用平行圆柱齿轮或圆锥齿轮传动，由电机驱动，经齿轮箱减速后传递给工作机工作。

齿轮箱全部采用硬齿面齿轮，经渗碳、淬火、磨齿，精度达 6 级（ISO1328-1995）以上，齿轮加工应用齿面修形、齿根喷丸强化、新型留磨滚刀等多项专有技术。采用立体造型设计，外观流畅美观，油封和机械密封相结合，整洁环保。此外，齿轮箱还设有智能化的电控与检测系统，实现温度与压力自动巡检，使全套装置安全可靠。

1.2 产品特点

本产品是 DONLY 集合多年来的经验的创新产品。它采用最先工艺，严格的质量控制系统和检测程序。不断地进行新品开发，使 DONLY 始终处行业的领先地位。

1. 采用平行圆柱齿轮传动，模块化设计，主要零部件可以互换，减少了备件种类。
2. 采用独立的润滑系统、内置式冷却器，润滑可靠、充分，外形简洁美观，保养维修方便。
3. 齿轮采用优质合金钢，经渗碳、淬火、喷丸强化，磨齿等工艺加工制成。
4. 齿轮具有体积小、重量轻、精度高、高效重载、平稳低噪、可靠性高和寿命长等特点。

1.3 应用范围

输入转速一般： $n_1 \leq 1800r/min$

工作环境温度： $-40^{\circ}C \sim +50^{\circ}C$

可广泛用于橡胶、塑料行业

齿轮箱轴伸配键普通型平键按 GB/T 1096-2003、切向键及其键槽按 GB/T 1974-2003、普通平键键槽尺寸按 GB/T 1095-2003 执行。

1.1 General notes

The main gear unit for Rubber and Plastic Industry is developed and designed on the basis of fully absorbing foreign advanced technology combined with the experience and characteristics of the company. It uses parallel cylindrical gear or bevel gear for transmission driven by the motor, and transmits the power to the working machine after reduction by the gear unit.

Gears are all hard flank, carburized, quenched, ground. The gear quality is over class 6 (ISO1328-1995). During machining the gear, new technologies are applied, such as teeth relief, Shot peening on the root, and new type hob with stock. The gear unit is designed by 3D software and has a smooth and beautiful appearance. And the gear unit is clean and environmentally protection with the combination of seals and mechanical seals. In addition, intelligentized electrical control and inspection system are equipped to fulfill the automatic inspection for bearing temperature and oil pressure, all these make the machine work safety and reliability.

1.2 Product features

This type product is an innovative one combined with over the years of experience of DONLY. It uses the most advanced technology, strict quality control system and testing procedures. Continued new product development make DONLY have the leading position in the industry.

1. Using parallel cylindrical gear drive, modular design, the main components are interchangeable, reducing the types of spare parts.
2. Using an independent lubrication system, built-in cooler, reliable and adequate lubrication, Having a simple and beautiful appearance and convenient maintenance.
3. The gears are made of high-grade alloy steel, carburized, quenched and ground.
4. It possesses the advantages of small dimension, light weight, high precise, heavy load, high efficiency, long life duration, smooth transmission, and low noise.

1.3 Suitable scope

Input revolution: $n_1 \leq 1800r/min$

Working environmental temperature: $-40^{\circ}C \sim +50^{\circ}C$

Be widely used in the Rubber and Plastic Industry

Extension shaft end with key to GB/T 1095-2003, GB/T 1974-2003 and GB/T 1096-2003.

2.1 产品特征

概述:

DLDYJ 系列高扭矩齿轮箱是借鉴德国同行的设计理念和办法。专为单螺杆挤出机配套设计的硬齿面齿轮传动装置。

该系列产品外形新颖美观、结构紧凑合理、噪音指标低、承载能力强、传动效率高，可以满足长期的无故障运行，渗漏油率小于 1‰，主要零部件寿命大于 50000 小时，其承载能力与德国 E2HA 系列相当，比同规格的 ZLYJ 齿轮箱高 60%左右。

箱体:

箱体结构在设计时兼顾了吸收噪音的功能，材质采用高品质的铸铁，并进行充分的时效处理，应用先进的加工工艺，从而保证了箱体的高精度以及精度的可保持性。

齿轮:

齿轮及轴类材料均选用高品质合金钢材 20CrMnTi，20CrMnMo、20CrNi2MoA，经渗碳淬火后齿面硬度达 HRC58-62，经精密磨齿后，磨齿精度可以达到 6 级以上（GB / T10095-2001），同时进行齿廓和螺旋线修形，以保证齿轮在负载状态下的完美啮合，从而实现低噪音和高效率。

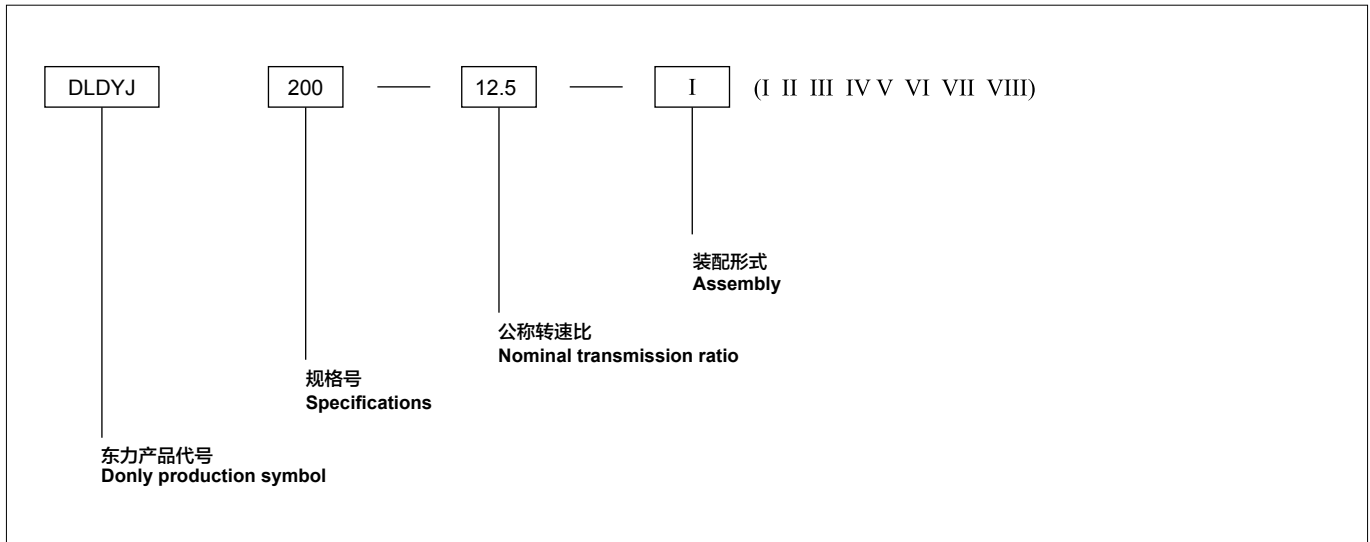
2.2 适用范围

- 1. 高速轴转速不大于 1500 转 / 分。
- 2. 齿轮传动圆周速度不大于 20 米 / 秒。
- 3. 工作环境温度为 -40℃ ~ 45℃，如果低于 0℃，启动前润滑油应预热至 0℃以上，本齿轮箱可用于正反两个方向运转，但部分机型高速轴带单向油泵，默认方向为：面对输出轴，输出轴为顺时针旋转。如方向改变，请在订货时说明。

2.3 齿轮箱型号

在齿轮箱型号中，含系列代号、规格号、公称传动比、装配形式。

标记示例



2.1 Product features

General notes:

DLDYJ series high torque gear unit is designed according to the advanced theory and method in the same industry of Germany, especially used as Single-screw Extruders.

The gear unit of this series which has a smart figuration, compact construction, low noise,high carrying capacity, high transmission efficiency can assure long-time trouble-free operation, oil leakage rate less than one thousandth. The life hour of main parts can reach 50000, the carrying capacity is as good as E2HA in Germany, and about 60% higher than ZLYJ series in the same specification.

Casting:

Casting made of high-quality cast iron is designed to develop the ability of absorbing noise, with full aging treatment and advanced manufacture procedure to assure a high precision casting and maintain the accuracy.

Gear:

All gears are made of high quality alloy steel 20CrMnTi, 20CrMnMo, 20CrNi2MoA.case carburized and quenched with surface hardness 58-62 HRC,finish ground with quality class 6 (GB/T10095-2001), lead and profile modifications that assure perfect contact under load, extended to a low noise and high efficiency performance.

2.2 Application scope

- 1. with high speed shaft speed of not more than 1500 rpm.
- 2. with gear circumferential speed of not more than 20 m/s.
- 3. with working environment temperature -40℃ ~ 45℃，if the working environment temperature is less than 0℃，before the start of the lubricating oil should be above preheat to 0℃，the gear unit can be used for the operation of two opposite direction, but the partial type high speed shaft with single pump,the default direction is:in the face of the output shaft, the output shaft to rotate clockwise. Such as the direction of change, please specify when ordering.

2.3 Gear unit type

There are series of codes, specifications, nominal transmission ratio and assembly in the gear unit type.

Sample of the code

DLDYJ 单螺杆高扭矩挤出机齿轮箱

DLDYJ Gear Units Single Screw High Torque Extruder

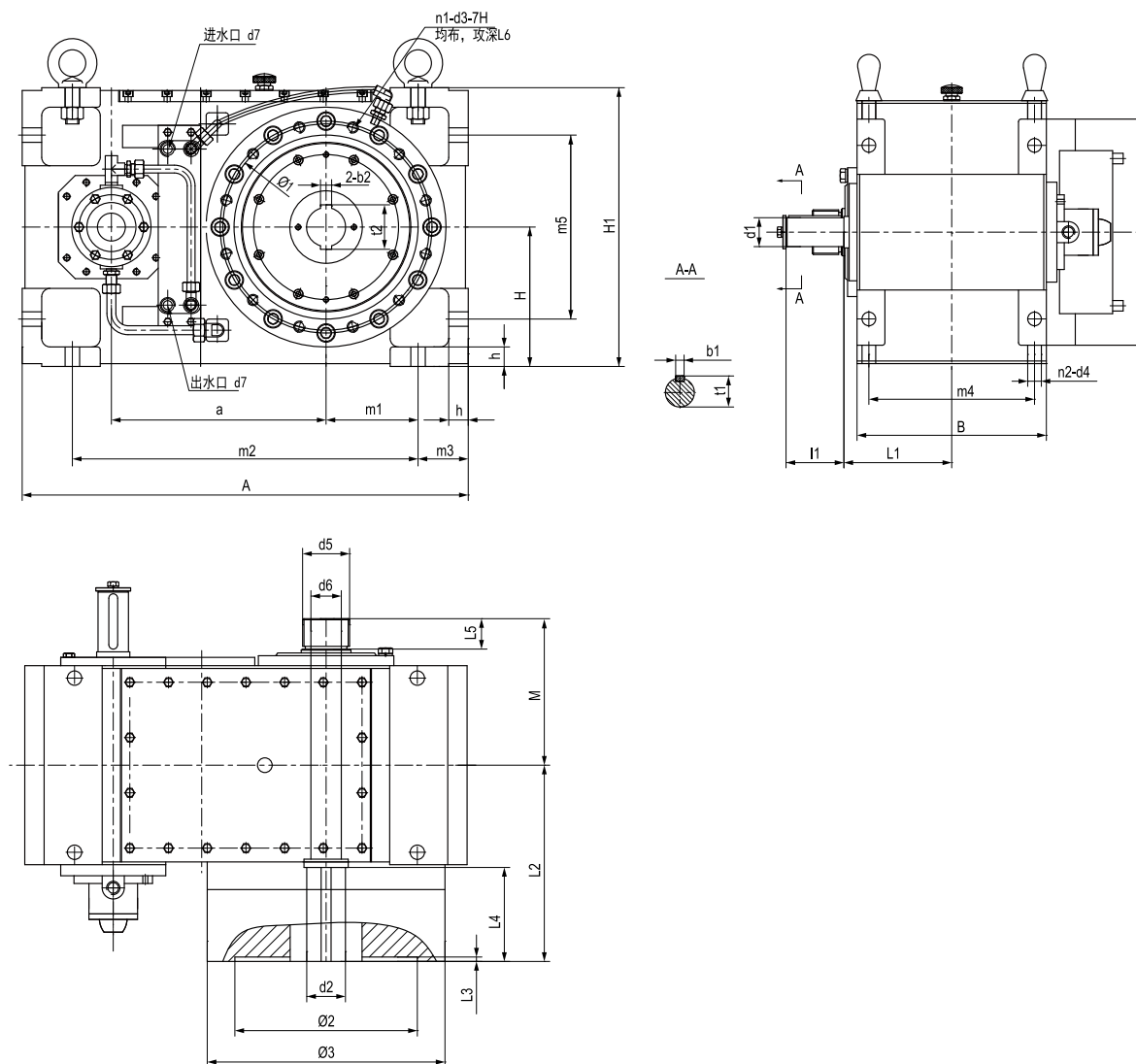
2.4 性能参数

2.4 Performance parameters

规格 Specifi- cations	输入转速 Input speed n1(rpm)																	推力 轴承 型号 Thrust bearing model
		6.3		8		10		12.5		14		16		18		20		
		Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	Pm (kW)	T2 (Nm)	
DLDYJ133	1500	27	1710	34	1733	30	1918	20	1602	17.1	1546	16.3	1610					29416
	1000	18	1732	23	1757	20	1918	14	1682	11.8	1601	11.3	1676					
	750	14	1985	17.8	1814	15.4	1969	10.7	1715	9	1628	8.6	1725					
DLDYJ146	1500	62	2526	51	2672	43	2813	34	2677	30	2653	26	2605	23	2624	19.1	2348	29417
	1000	35	2630	35	2751	29	2846	23	2675	20	2653	18	2773	15.7	2687	13.5	2489	
	750	33	2690	27	2830	23	3009	16.9	2663	15.8	2805	13.5	2773	11.3	2582	10	2481	
DLDYJ160	1500	90	3665	71	3719	61	3803	49	3798	41	3642	34	3491	30	3423	29	3564	29418
	1000	62	3740	49	3851	42	3925	34	3955	28	3643	23	3543	21	3594	19.1	3521	
	750	47	3830	37	3879	32	3990	26	4057	21	3827	17.4	3574	15.8	3610	14.6	3594	
DLDYJ180	1500	133	5348	100	5008	80	5079	66	5145	60	5204	52	5255	41	4678	37	4548	29422
	1000	90	5430	69	5285	54	5162	45	5325	41	5334	35	5426	28	4792	25	4609	
	750	69	5510	52	5211	42	5348	34	5367	30	5385	26	5374	21	4718	19.1	4738	
DLDYJ200	1500			124	6210	96	6116	77	6072	68	6098	60	6006	55	6187	50	5603	29424
	1000			86	6462	65	6302	52	6154	46	6118	41	6156	37	6243	34	6268	
	750			65	6514	51	6591	39	6156	35	6283	30	6201	28	6397	25	6153	
DLDYJ225	1500					140	9046	113	8717	98	8609	86	8609	78	8910	70	8615	29426
	1000					97	9291	77	8903	68	8884	59	8859	53	9071	47	8818	
	750					74	9348	59	9103	51	9036	44	9095	41	9367	36	9095	
DLDYJ250	1500					194	12384	149	11702	135	11753	119	11912	99	11309	93	11640	29428
	1000					134	12836	102	12393	92	12864	81	12182	68	11764	64	12008	
	750					102	13023	78	12647	71	13243	62	12439	52	11995	48	12127	
DLDYJ280	1500					342	21601	249	20169	226	21057	182	18257	182	21017	158	19933	29434
	1000					235	22398	171	20777	154	21533	125	18799	125	21626	109	20291	
	750					180	22859	131	21240	117	21823	96	18942	96	21829	84	20836	
DLDYJ320	1500					455	28891	378	29301	335	29900	305	30122	268	30433	246	30550	29440
	1000					312	29736	258	30954	230	30255	208	30797	182	31038	168	31275	
	750					237	30098	197	31513	174	31060	159	31900	140	31833	128	31751	
DLDYJ360	1500					593	37629	477	38152	452	39675	371	37217	323	37481	303	37629	29448
	1000					406	38657	327	39232	309	40647	253	38050	221	38514	207	38535	
	750					311	39495	250	39992	236	41430	194	38922	168	39036	158	39192	

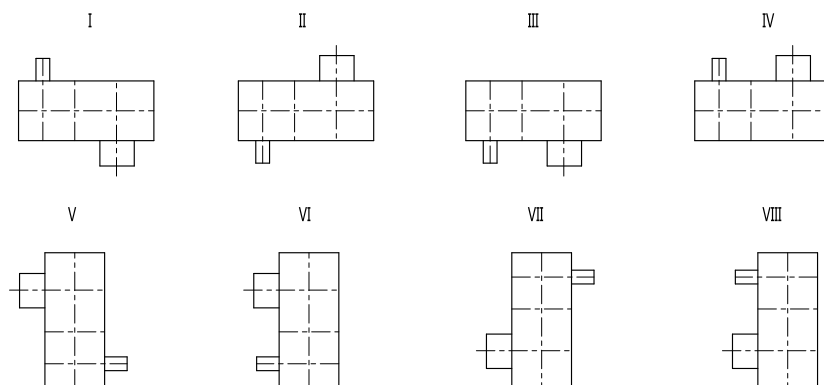
2.5 外形尺寸

2.5 Outline dimensions



装配形式

Assembly



DLDYJ 单螺杆高扭矩挤出机齿轮箱

DLDYJ Gear Units Single Screw High Torque Extruder

规格 Specifi- cations	a	外形尺寸 Outline dimensions					地脚安装尺寸 Installation dimension of foundation							输入轴尺寸 Input shaft size				
		A	B	H	H1	h	n2	d4	m1	m2	m3	m4	m5	L1	11	d1(m6)	t1	b1
DLDYJ133	218	478	215	140	280	22	4	16	113	374	52	180	186	125	60	28	31	8
DLDYJ146	260	560	256	160	320	25	4	18	128	388	62	210	220	148	80	38	41	10
DLDYJ160	277	620	256	170	340	25	4	18	141	485	67.5	225	225	148	80	38	41	10
DLDYJ180	320	700	340	220	440	30	4	18	140	540	80	290	290	200	80	45	48.5	14
DLDYJ200	340	750	340	240	480	30	4	18	170	590	80	290	330	200	80	45	48.5	14
DLDYJ225	385	800	360	250	500	35	4	26	165	620	90	315	330	205	110	55	59	16
DLDYJ250	430	930	380	280	560	45	4	26	205	720	105	330	360	220	110	60	64	18
DLDYJ280	500	1000	410	300	600	50	4	34	190	780	110	345	380	240	125	65	69	18
DLDYJ320	555	1120	450	350	700	60	4	40	210	860	130	380	450	265	130	80	85	22
DLDYJ360	615	1200	490	400	800	60	4	40	235	940	130	415	530	275	130	90	95	25

规格 Specifi- cations	输出轴尺寸 Output shaft size				推力包联接尺寸 Thrust packet link size								输出轴尾部尺寸 output shaft tail size				冷却器接口 Cooler interface	重量 Weight
	d2(HB)	14	t2	b2(F9)	12	Ø1	Ø2(H8)	L3	Ø3	n1	d3	L6	d5	d6	L5	M	d7	Kg
DLDYJ133	38	90	44.6	10	205	205	180	8	240	8	M12	24	M16	20	30	137	DN20	175
DLDYJ146	45	120	52.6	14	245	230	200	8	260	8	M12	24	M20	25	30	153	DN20	195
DLDYJ160	50	120	57.6	14	235	245	210	8	280	8	M16	28	M20	25	30	153	DN20	245
DLDYJ180	55	140	63.6	16	323	290	250	8	330	12	M16	28	M80X4	35	50	250	DN20	465
DLDYJ200	60	170	68.8	18	330	300	270	8	350	12	M16	28	M85X4	40	50	250	DN20	480
DLDYJ225	70	170	78.8	18	355	370	330	8	430	12	M20	35	M85X4	55	50	265	DN20	650
DLDYJ250	80	180	90.8	22	380	370	330	8	430	12	M20	35	M85X4	55	50	285	DN20	830
DLDYJ280	90	180	100.8	25	435	410	360	8	460	12	M24	40	M85X4	55	50	300	DN20	1150
DLDYJ320	110	200	122.8	28	480	455	400	10	520	12	M24	40	M90X4	60	60	325	DN20	1480
DLDYJ360	120	245	134.8	32	510	475	400	15	550	12	M30	50	M90X4	60	60	342	DN20	1950

2.6 热功率参数

2.6 Thermal capacity

齿轮箱规格 Gear unit specification	热功率 (kW) Thermal power		
	自然冷却 Natural cooling	盘管冷却 Cooling coil	冷凝器冷却 Condenser cooling
DLDYJ133	13	16	30
DLDYJ146	17	21	45
DLDYJ160	19	25	60
DLDYJ180	30	37	90
DLDYJ200	34	41	130
DLDYJ225	38	46	205
DLDYJ250	47	59	250
DLDYJ280	53	66	350
DLDYJ320	71	86	460
DLDYJ360	86	102	595

注：以上数据均为平衡温度 80℃（温度 40℃）时的热功率
Note: the above data are the equilibrium temperature of 80℃ (temperature of 40℃) thermal power

3.1 概述

DLPSY 系列平双齿轮箱是为异向平行双螺杆挤出机设计开发的标准传动部件。其齿轮采用低碳合金钢经渗碳、淬火、磨齿以达到高强度、高精度；输出轴采用特殊合金钢精心制作，以适应大扭矩输出要求；推力轴承采用先进的串联推力圆柱滚子轴承和满装圆柱滚子轴承的组合设计，承载能力大；润滑方式采用浸油和喷油润滑方式，必要时还可根据机组的不同要求配置列管式冷却系统，对润滑油进行冷却。整机外形匀称、结构先进、承载性能优越、运转平稳，是平双机组齿轮箱的理想选择。

3.2 适用范围

1. 本系列产品用于异向平行双螺杆机组。
2. 工作环境温度 $-10^{\circ}\text{C} \sim 45^{\circ}\text{C}$ 。环境温度低于 0°C 时启动前润滑油应预热，热功率不够须采取冷却措施。
3. 齿轮箱输入转速 n_1 一般不大于 1500rpm 。

3.1 General notes

DLPSY series gear units are standard driving parts designed and developed for counterrotating parallel twin screw extruder. Its gear is made of low carbon alloy steel after carbon penetrating, quench and teeth grinding so as to reach high strength and precision. The output shaft is finely made of special alloy steel to suit the requirement of large output torque. The thrust bearing group is a combination design adopted advanced tandem thrust cylindrical roller bearing and full complement cylindrical roller bearings which have a larger bearing capacity. The lubrication style are oil immersion and spray lubrication and can be equipped with pipe style cooling system based on different requirement of machine for cooling lubrication oil. The whole machine has well-balanced appearance, advanced structure, superior bearing performance and smooth operation. It is an ideal selection of counterrotating parallel twin screw extruder gear unit.

3.2 Applicable scope

1. This series product is suitable for counterrotating parallel twin screw extruder.
2. The temperature in work environment is $-10^{\circ}\text{C} \sim 45^{\circ}\text{C}$. When temperature is lower than 0°C , the lubricating oil should be preheated before starting. When thermal power is not enough, the cooling measure should be taken.
3. The input speed of the gear unit is normally not larger than 1500 rpm .

DLPSY 异向平行双螺杆挤出机齿轮箱

DLPSY Series Gear Units For Parallel Twin Screw Extruder

3.3 外形尺寸

型号 Model	A	B	C	D	H	L	dm6	l1
76(90)	2202	660	370	Ø265	1000	76	Ø45	82
90(107)	2450	750	415	Ø300	1170	90	Ø50	95
92.5(114)	2572	820	430	Ø300	1250	92.5	Ø60	105
95(116)	2597	820	460	Ø330	1250	95	Ø60	105
104(120)	2595	820	430	Ø340	1250	104	Ø60	105
110(130)	2725	870	285	Ø350	1320	110	Ø65	120

型号 Model	a4	a5	a6	a7	a8	a9	a10	H1
76(90)	735	440	122	565	60	90	130	1146
90(107)	885	515	125	695	55	110	145	1316
92.5(114)	890	540	150	710	60	90	130	1396
95(116)	890	540	150	710	60	90	130	1355
104(120)	890	540	150	710	80	90	235	1395
110(130)	865	510	160	625	50	105	175	1466

型号 Model	f1	f2	f3	f4	f5	n-d1	n1-d2	INT
76(90)	300	Ø200	200	292	200	6-Ø26	12-M20	21Z×2.5m×30R
90(107)	350	Ø250	225	330	225	6-Ø32	12-M20	24Z×2.5m×30R
92.5(114)	360	Ø230	227.5	370.5	225	6-Ø32	12-M24	25Z×2.5m×30R
95(116)	360	Ø230	227.5	370.5	225	6-Ø32	12-M24	26Z×2.5m×30R
104(120)	390	Ø254	240	358	240	6-Ø32	12-M24	28Z×2.5m×30R
110(130)	400	Ø315	250	387.5	250	7-Ø32	12-M24	30Z×2.5m×30R

3.4 承载能力

序号 No	型号 Model	输出轴中心距 Central distance of Output shaft (mm)	螺杆直径 Screw dia (mm)	速比 Driving ratio	输入转速 Input Speed (r/min)	输出转速 Output speed (r/min)	输入功率 Input power (kW)	最大单轴输出扭矩 Output torque of Single Shaft (Nm)
1	DLPSY 76/90	76	90	33.21	1500	45.2	60	6338
2	DLPSY 90/107	90	107	33.13	1500	45.3	80	8438
3	DLPSY 92.5/114	92.5	114	32.15	1500	46.7	100	10235
4	DLPSY 95/116	95	116	33.34	1500	45	100	10612
5	DLPSY 104/120	104	120	33.27	1500	45.09	110	11650
6	DLPSY 110/130	110	130	33.16	1500	45.2	150	15838

3.3 Outline dimensions

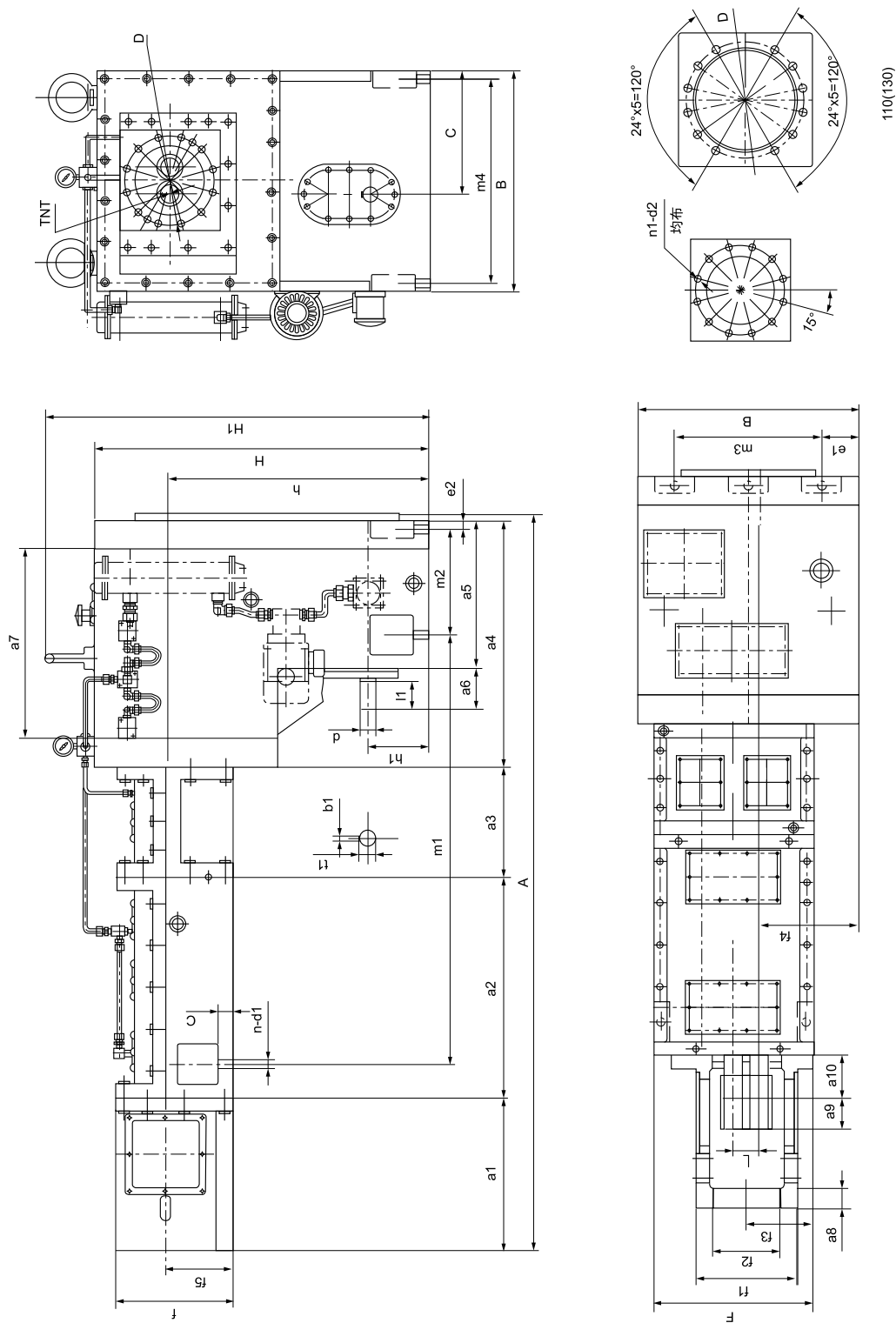
型号 Model	b1	t1	F	e1	e2	a1	a2	a3
76(90)	14	48.5	480	110	25	457	660	330
90(107)	14	53.5	525	135	30	370	790	385
92.5(114)	18	64	535	135	35	457	815	410
95(116)	18	64	535	135	35	457	815	410
104(120)	18	64	590	150	35	475	815	390
110(130)	20	72.5	590	130	40	400	950	510

型号 Model	h	h1	m1	m2	m3	m4	c	f
76(90)	780	180	1285	315	440	610	45	350
90(107)	990	200	1545	370	480	690	50	400
92.5(114)	985.76	225	1575	390	550	750	50	405
95(116)	985.76	225	1575	390	550	750	50	405
104(120)	980	225	1555	390	520	750	50	435
110(130)	1066.87	250	1815	340	305×2	790	55	450

3.4 Load capacity

3.5 外型尺寸及装配形式

3.5 Outline dimensions and assembly



DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

4.1 概述

单螺杆挤出机用齿轮箱是为复合或单台挤出机配套的齿轮箱，主要用于橡胶塑料行业，作为挤出胶料传递动力装置使用，也可用于其它行业作为挤出物料的传动力装置。

复合挤出机组可用于轿车、轻卡及重载子午线轮胎的生产，可进行胎冠胶与胎肩翼胶及基部胶的复合、胎侧胶与子口耐磨胶的复合、三角胶的复合、及胎肩垫胶的挤出，也可用于斜交轮胎生产，进行胎面和胎侧的机头内复合挤出整体制品。

如果你选择标准型产品，这意味着你可以得到可靠的质量、合理的价格、快捷的交付、无忧的售后，当然你也可以定制产品，只要你提供相关信息，我们会在很短的时间内提供解决方案。

4.1 General notes

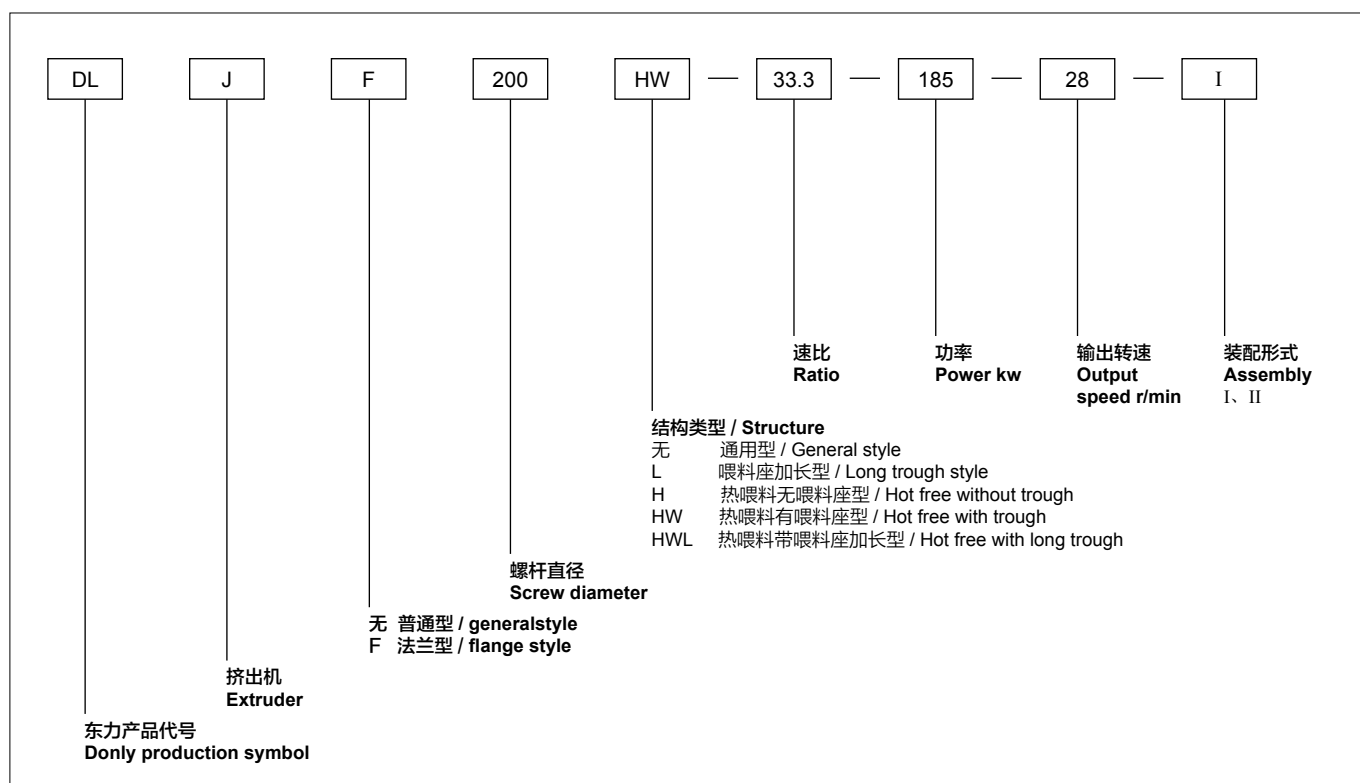
Single screw extruder gear unit is supporting for single or compound extruder, mainly used for Rubber and Plastics Industry as a power transmission device for rubber extrusion . It can also be used as a power transmission device for materials extrusion in other industries.

Composite extruder unit can be used for cars,light trucks and heavy duty radial tire production, composite of tread rubber and tire shoulder wing glue and base glue, adhesive wear rubber tire sidewall and bead, composite triangular rubber, extruding and shoulder pad. It can also be used for the production of bias tire, the head of the tread and sidewall compound extrusion whole products

If you choose standard type products,which means you can get the reliable quality, reasonable price, fast delivery, worry-free sale, of course, you can customize the product, as long as you provide relevant information, we will provide solutions in a very short period of time.

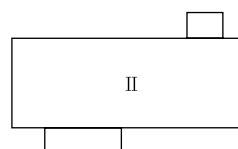
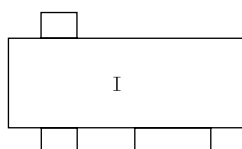
4.2 产品编号示例

4.2 Designation example



4.3 装配型式

4.3 Assembly



如果需要我们提供喂料齿轮副 订购产品时请提供图纸

If you need us to provide feeding gear pair, please provide us with the drawings when ordering products.

4.4 产品索引

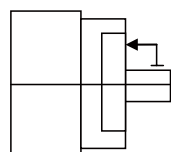
4.4 Product index

序号 Serial	规格 Size	产品编号 Designation	序号 Serial	规格 Size	产品编号 Designation
1	DLJ60	DLJ60-18.75-22-80-I/II	34	DLJ200	DLJ200-45.5-315-33-I/II
2	DLJ90	DLJ90-25-55-60-I/II	35		DLJ200-53.6-315-28-I/II
3		DLJ90-27.3-55-55-I/II	36		DLJ200-45.5-355-33-I/II
4		DLJ90-30-55-50-I/II	37		DLJ200-53.6-355-28-I/II
5	DLJ90L	DLJ90L-25-55-60-I/II	38	DLJ200H	DLJ200H-33.3-185-45-I/II
6		DLJ90L-27.3-55-55-I/II	39	DLJ200HW	DLJ200HW-33.3-185-45-I/II
7		DLJ90L-30-55-50-I/II	40	DLJ250	DLJ250-38.5-500-26-I/II
8	DLJ120	DLJ120-30-90-50-I/II	41		DLJ250-50-500-20-I/II
9		DLJ120-37.5-90-40-I/II	42	DLJ250H	DLJ250H-33.3-220-45-I/II
10		DLJ120-30-110-50-I/II	43		DLJ250H-33.3-250-45-I/II
11		DLJ120-37.5-110-40-I/II	44	DLJ250HL	DLJ250HL-33.3-220-45-I/II
12	DLJ150	DLJ150-33.3-185-45-I/II	45		DLJ250HL-33.3-250-45-I/II
13		DLJ150-33.3-220-45-I/II	46	DLJ250HW	DLJ250HW-33.3-220-45-I/II
14		DLJ150-37.5-220-40-I/II	47		DLJ250HW-33.3-250-45-I/II
15		DLJ150-33.3-250-45-I/II	48	DLJ250HWL	DLJ250HWL-33.3-220-45-I/II
16		DLJ150-37.5-250-40-I/II	49		DLJ250HWL-33.3-250-45-I/II
17	DLJ150L	DLJ150L-37.5-250-40-I/II			
18	DLJF60	DLJF60-18.75-22-80-I/II	50	DLJF200	DLJF200-45.5-315-33-I/II
19	DLJF90	DLJF90-25-55-60-I/II	51		DLJF200-53.6-315-28-I/II
20		DLJF90-27.3-55-55-I/II	52		DLJF200-45.5-355-33-I/II
21		DLJF90-30-55-50-I/II	53		DLJF200-53.6-355-28-I/II
22	DLJF90L	DLJF90L-25-55-60-I/II	54	DLJF 200H	DLJF200H-33.3-185-45-I/II
23		DLJF90L-27.3-55-55-I/II	55	DLJF200HW	DLJF200HW-33.3-185-45-I/II
24		DLJF90L-30-55-50-I/II	56	DLJF250	DLJF250-38.5-500-26-I/II
25	DLJF120	DLJF120-30-90-50-I/II	57		DLJF250-50-500-20-I/II
26		DLJF120-37.5-90-40-I/II	58	DLJF250H	DLJF250H-33.3-220-45-I/II
27		DLJF120-30-110-50-I/II	59		DLJF250H-33.3-250-45-I/II
28		DLJF120-37.5-110-40-I/II	60	DLJF250HL	DLJF250HL-33.3-220-45-I/II
29	DLJF150	DLJF150-33.3-220-45-I/II	61		DLJF250HL-33.3-250-45-I/II
30		DLJF150-37.5-220-40-I/II	62	DLJF250HW	DLJF250HW-33.3-220-45-I/II
31		DLJF150-33.3-250-45-I/II	63		DLJF250HW-33.3-250-45-I/II
32		DLJF150-37.5-250-40-I/II	64	DLJF250HWL	DLJF250HWL-33.3-220-45-I/II
33	DLJF150L	DLJF150L-37.5-250-40-I/II	65		DLJF250HWL-33.3-250-45-I/II

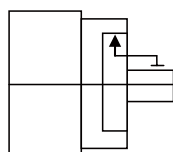
4.5 技术参数

4.5 Technical parameters

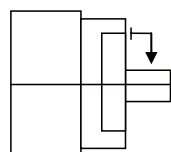
序号 No.	挤出机规格 Size		齿轮箱项目 Item				
	通用型 General	法兰型 Flange	倾斜角度 Tilt angle α	I. 端面相对低速 轴跳动 (mm) Face runout to low-speed shaft	II. 止口相对低速 轴跳动 (mm) Seam allowance runout to output shaft	III. 低速轴跳动 (mm) Runout of the output shaft	IV. 低速轴径向 位移 (mm) Radial displacement of the output shaft
1	DLJ60	DLJF60	0°	0.15	0.20	0.06	0.16
2	DLJ90	DLJF90	≤30°	0.15	0.20	0.06	0.16
3	DLJ90L	DLJF90L	≤30°	0.15	0.20	0.06	0.16
4	DLJ120	DLJF120	≤30°	0.15	0.20	0.06	0.16
5	DLJ200H	DLJF200H	≤30°	0.20	0.24	0.08	0.20
6	DLJ200HW	DLJF200HW	≤30°	0.20	0.24	0.08	0.20
7	DLJ250H	DLJF250H	≤30°	0.20	0.24	0.08	0.20
8	DLJ250HL	DLJF250HL	≤30°	0.20	0.24	0.08	0.20
9	DLJ250HW	DLJF250HW	≤30°	0.20	0.24	0.08	0.20
10	DLJ250HWL	DLJF250HWL	≤30°	0.20	0.24	0.08	0.20
11	DLJ150	DLJF150	≤30°	0.20	0.24	0.08	0.20
12	DLJ150L	DLJF150L	≤30°	0.20	0.24	0.08	0.20
13	DLJ200	DLJF200	≤25°	0.20	0.24	0.08	0.20
14	DLJ250	DLJF250	≤25°	0.25	0.28	0.10	0.25



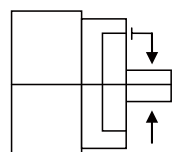
I、端面跳动
I.Face runout



II、端面止口跳动
II.Face spigot runout;

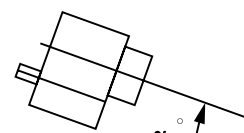


III、低速轴跳动
III.Low-speed shaft runout

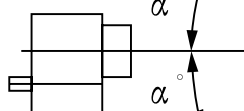


IV、低速轴径向跳动
IV.Radial displacement of low-speed shaft

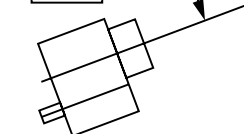
上位机
Top



中位机
Middle



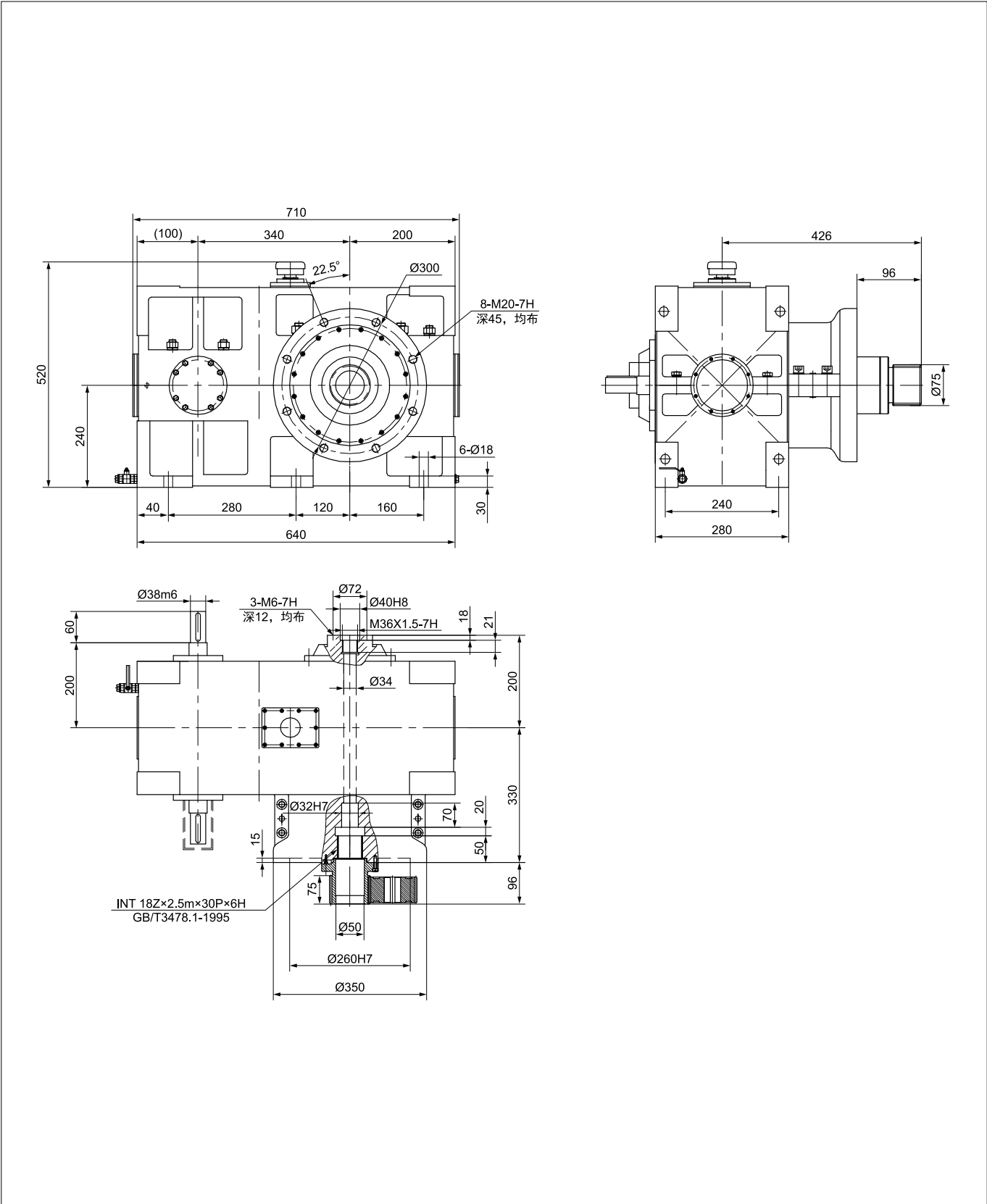
下位机
Bottom



DLJ60 单螺杆冷喂料挤出机齿轮箱
(Size: DLJ60)

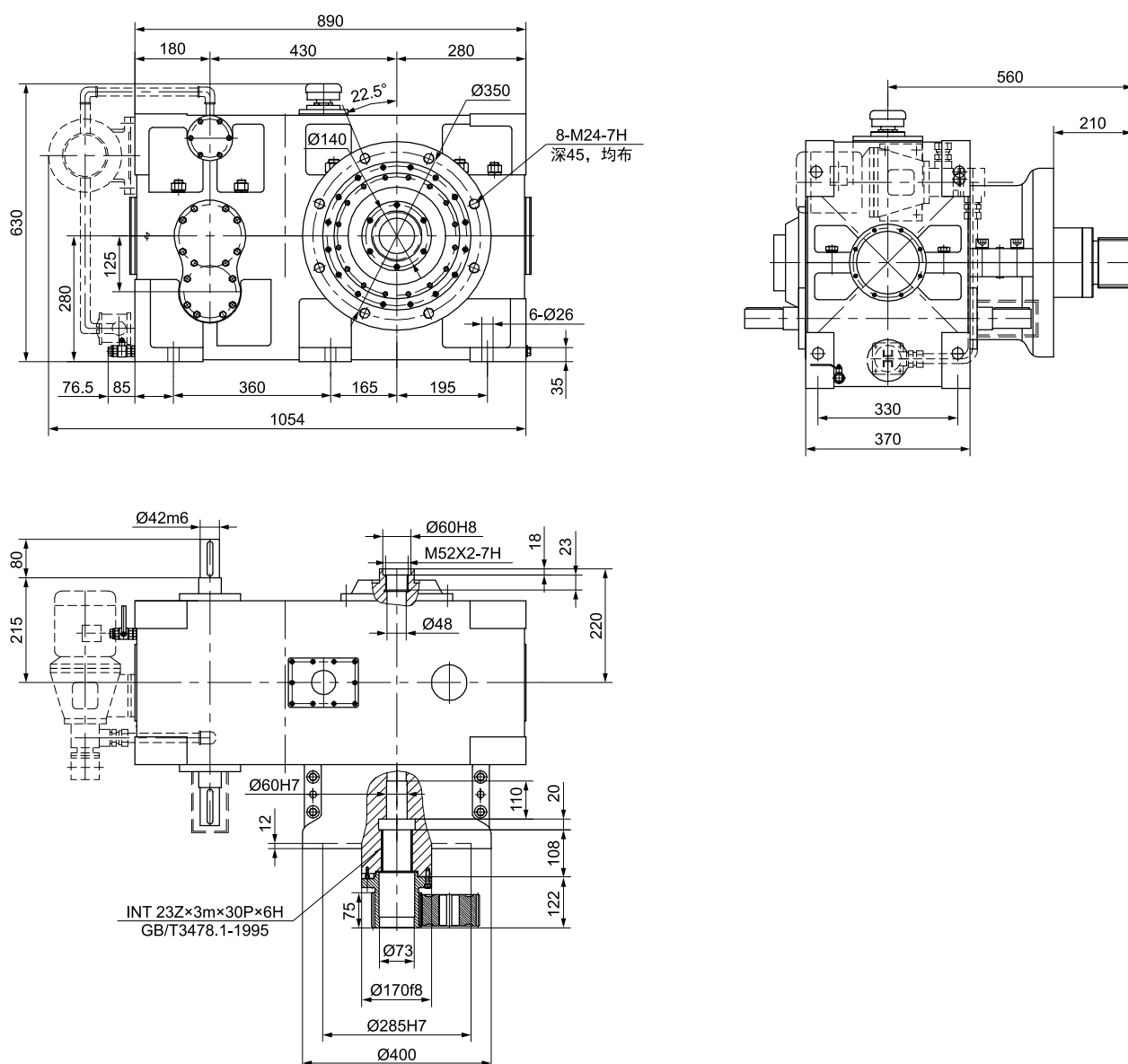
DLJ60 gear units for single screw cold feed extruder
(Size: DLJ60)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ60	DLJ60-18.75-22-80-I/II	22	1500	80	450



**DLJ90 gear units for single screw cold feed extruder
(Size: DLJ90)**

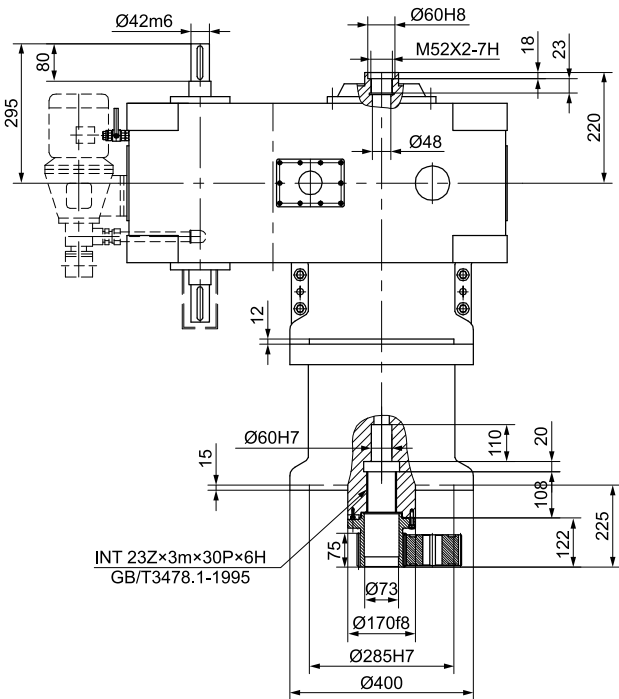
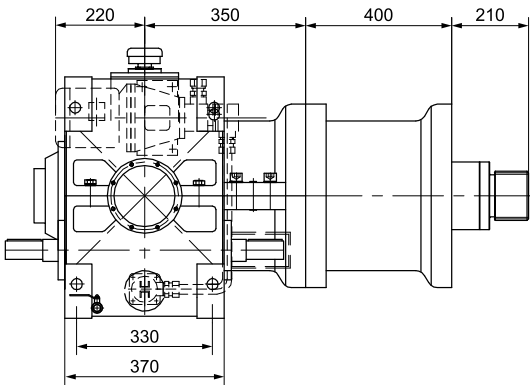
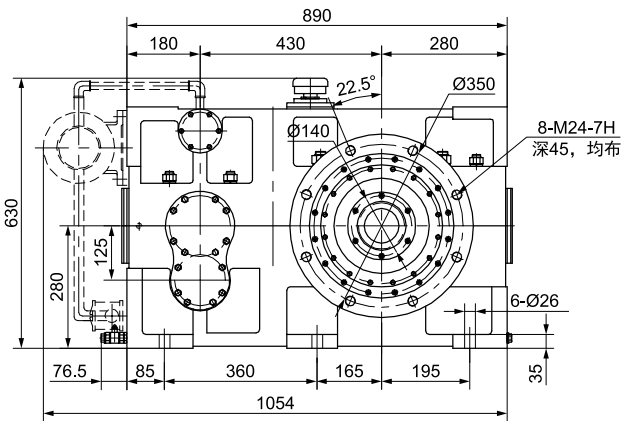
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ90	DLJ90-25-55-60-I/II	55	1500	60	900
	DLJ90-27.3-55-55-I/II	55	1500	55	
	DLJ90-30-55-50-I/II	55	1500	50	



DLJ90L 单螺杆冷喂料挤出机加长型齿轮箱
(Size:DLJ90L)

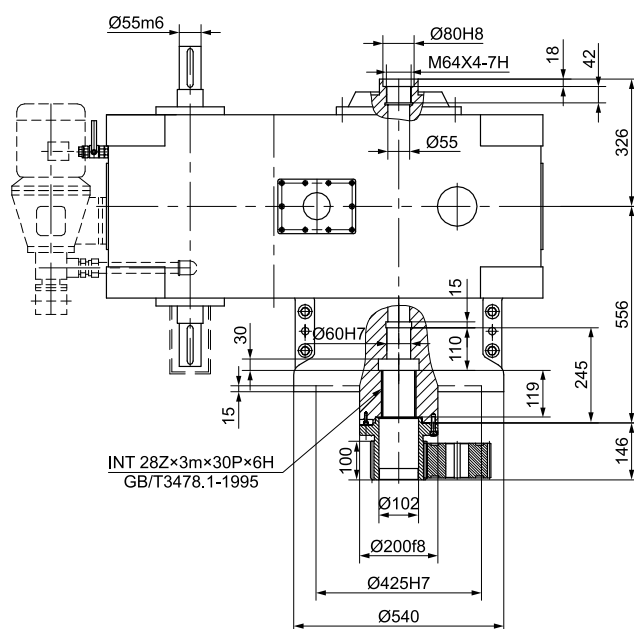
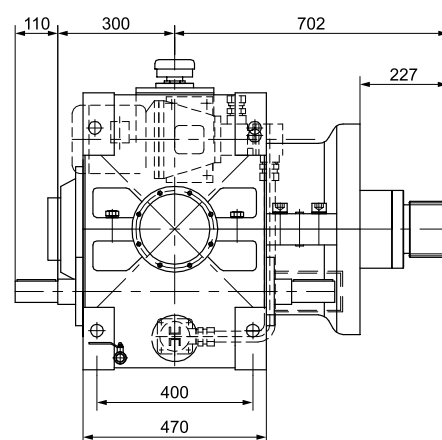
DLJ90L lengthened gear units for single screw cold feed extruder (Size: DLJ90L)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ90L	DLJ90L-25-55-60-I/II	55	1500	60	1100
	DLJ90L-27.3-55-55-I/II	55	1500	55	
	DLJ90L-30-55-50-I/II	55	1500	50	



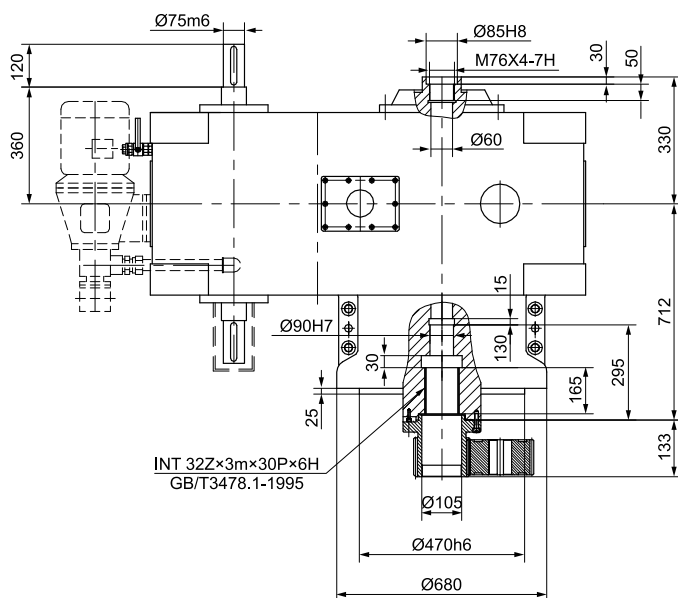
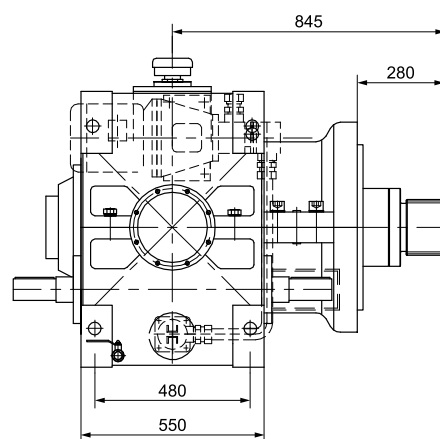
**DLJ120 gear units for single screw cold feed extruder
(Size: DLJ120)**

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ120	DLJ120-30-90-50-I/II	90	1500	50	1600
	DLJ120-37.5-90-40-I/II	90	1500	40	
	DLJ120-30-110-50-I/II	110	1500	50	
	DLJ120-37.5-110-40-I/II	110	1500	40	



**DLJ150 gear units for single screw cold feed extruder
(Size: DLJ150)**

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ150	DLJ150-33.3-185-45-1/II	185	1500	45	2600



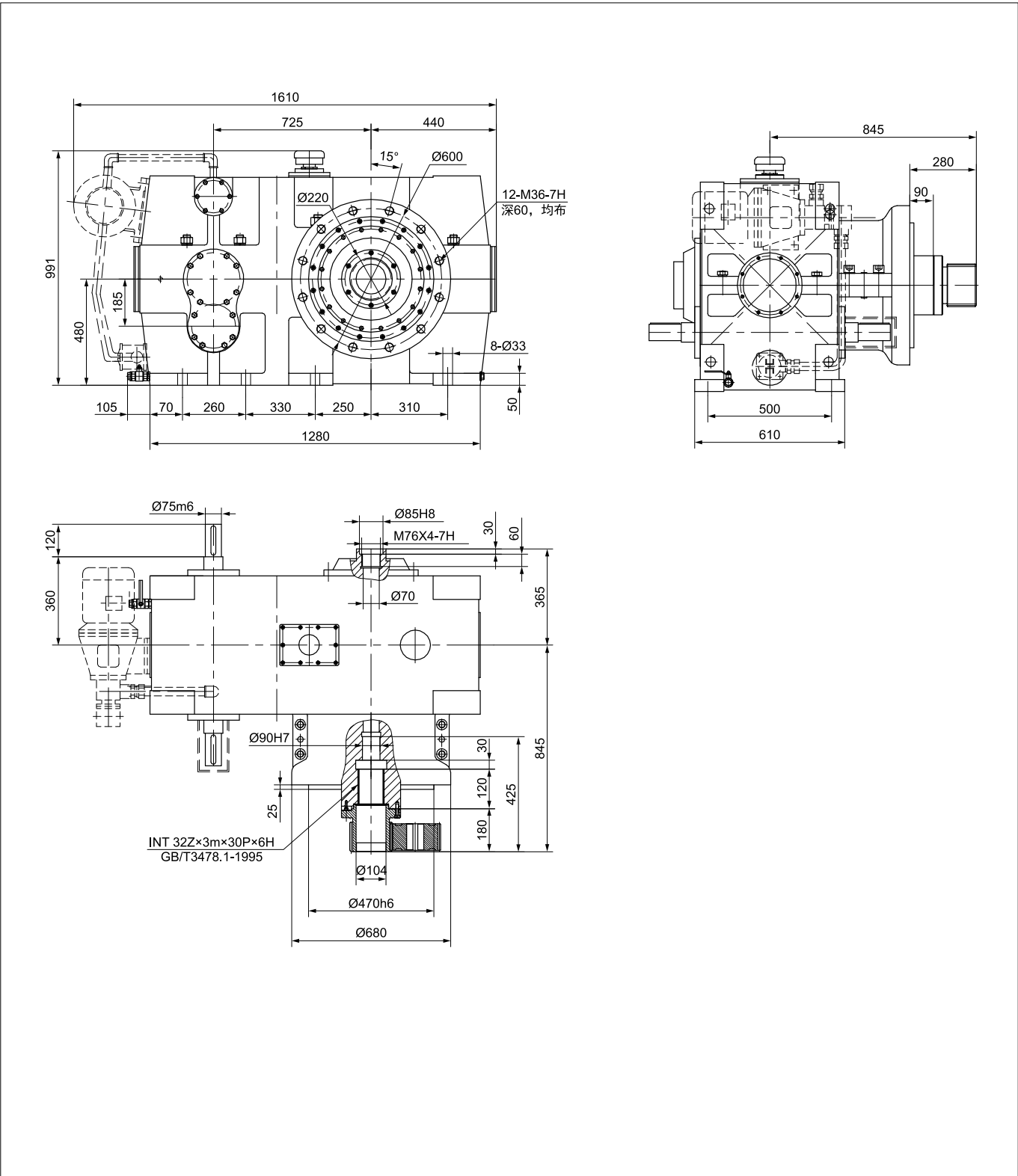
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJ150 单螺杆冷喂料挤出机齿轮箱
(Size: DLJ150)

DLJ150 gear units for single screw cold feed extruder
(Size: DLJ150)

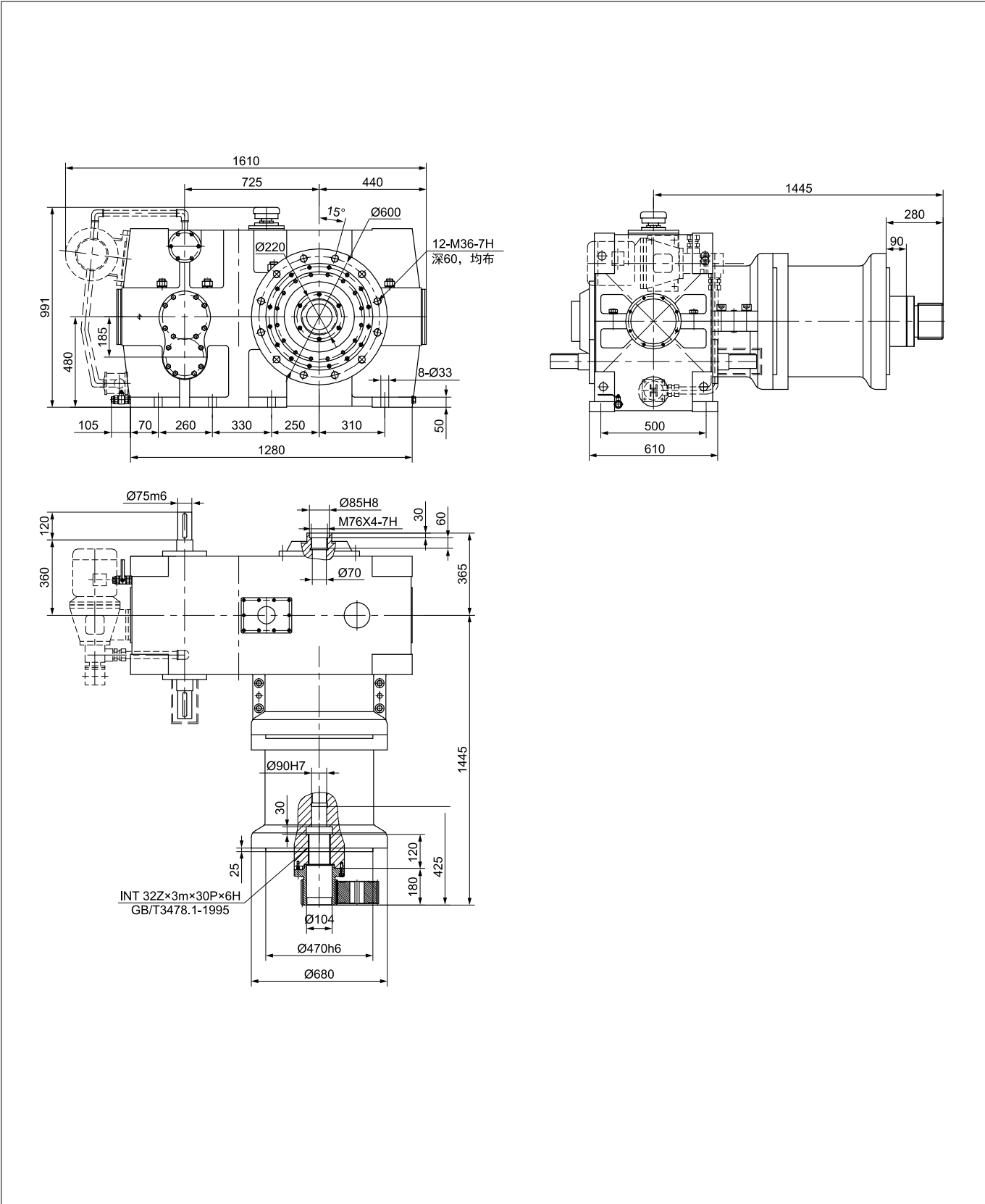
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ150	DLJ150-33.3-220-45-I/II	220	1500	45	3000
	DLJ150-37.5-220-40-I/II	220	1500	40	
	DLJ150-33.3-250-45-I/II	250	1500	45	
	DLJ150-37.5-250-40-I/II	250	1500	40	



DLJ150L 单螺杆冷喂料挤出机加长型齿轮箱
(Size: DLJ150L)

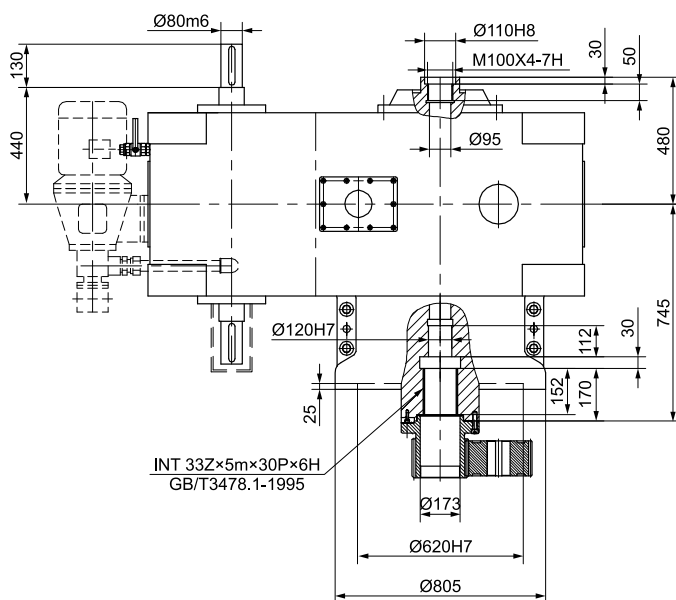
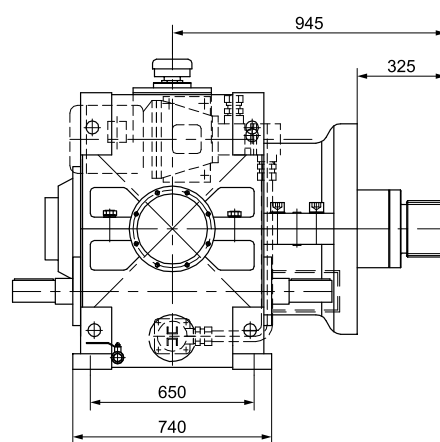
DLJ150L lengthened gear units for single screw cold
feed extruder (Size: DLJ150L)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ150L	DLJ150L-37.5-250-40-I/II	250	1500	40	3800



**DLJ200 gear units for single screw cold feed extruder
(Size: DLJ200)**

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ200	DLJ200-45.5-315-33-I/II	315	1500	33	5200
	DLJ200-53.6-315-28-I/II	315	1500	28	
	DLJ200-45.5-355-33-I/II	355	1500	33	
	DLJ200-53.6-355-28-I/II	355	1500	28	



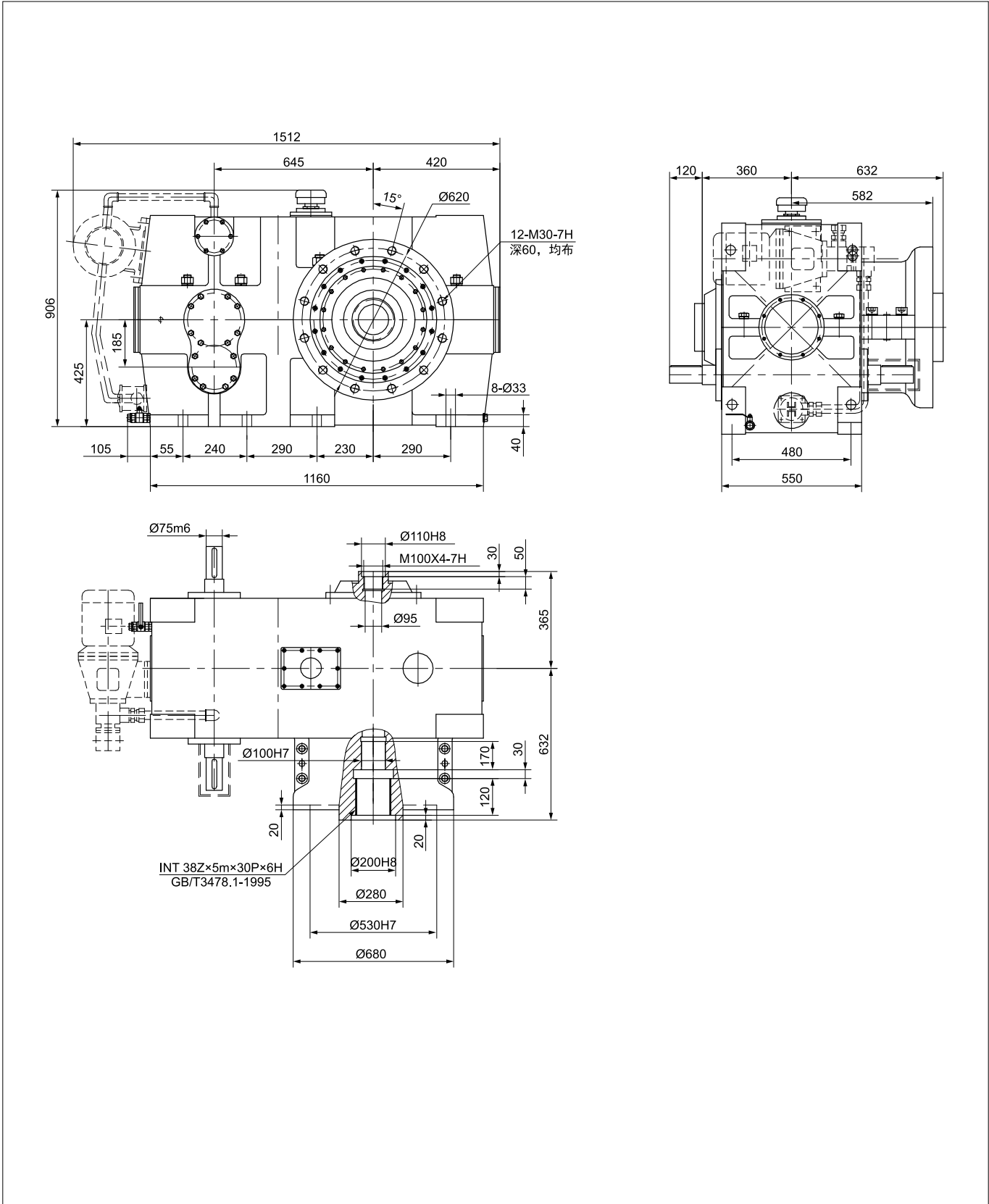
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJ200H 单螺杆热喂料无喂料座挤出机齿轮箱
(Size: DLJ200H)

DLJ200H gear units for single screw hot feed extruder
without feeding base (Size: DLJ200H)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ200H	DLJ200H-33.3-185-45-I/II	185	1500	45	2800



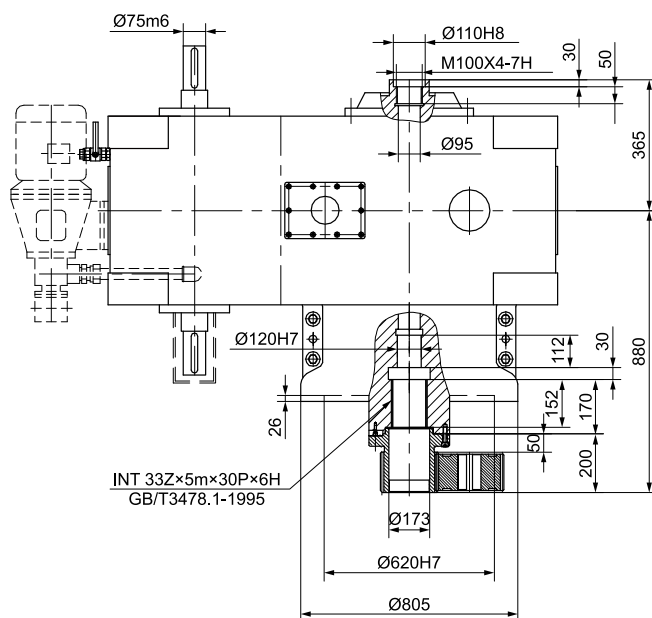
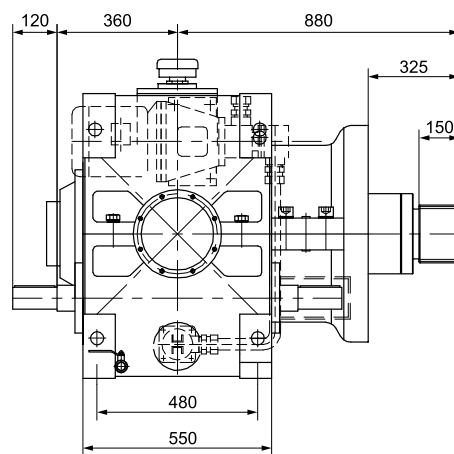
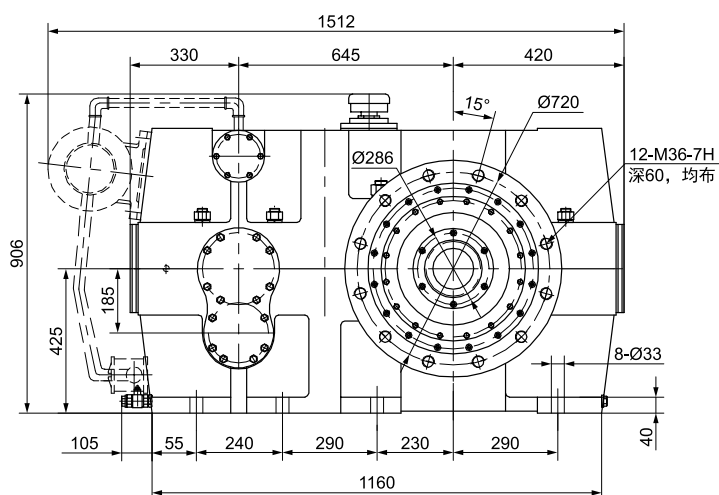
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJ200HW 单螺杆热喂料带喂料座挤出机齿轮箱
(Size: DLJ200HW)

DLJ200HW gear units for single screw hot feed extruder
with feed base (Size: DLJ200HW)

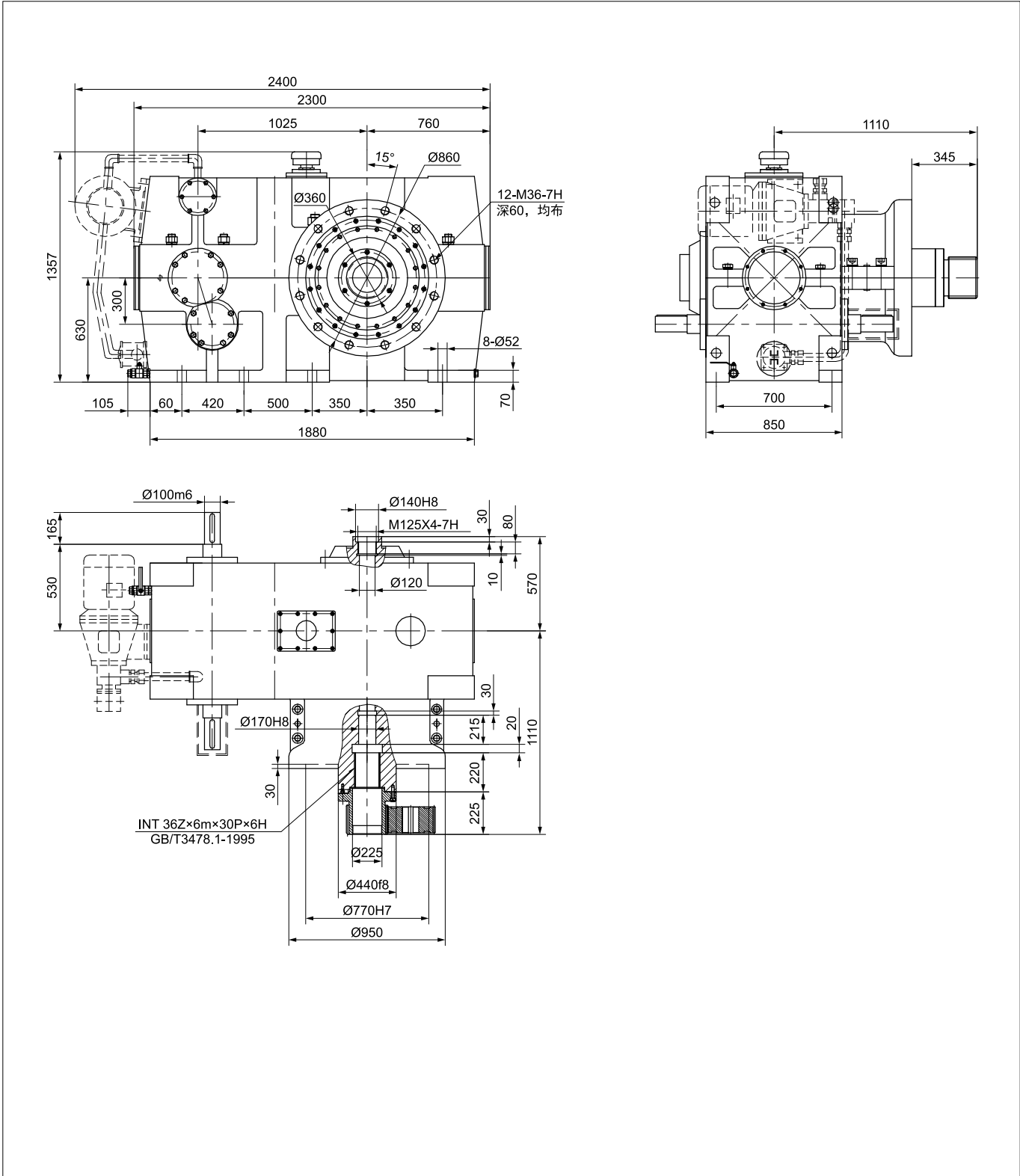
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ200HW	DLJ200HW-33.3-185-45-I/II	185	1500	45	2850



DLJ250 单螺杆冷喂料挤出机齿轮箱
(Size: DLJ250)

DLJ250 gear units for single screw cold feed extruder
(Size: DLJ250)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ250	DLJ250-38.5-500-26-I/II	500	1000	26	7800
	DLJ250-50-500-20-I/II	500	1000	20	8200
	DLJ250-38.5-450-26-I/II	450	1000	26	7800
	DLJ250-50-450-20-I/II	450	1000	20	8200



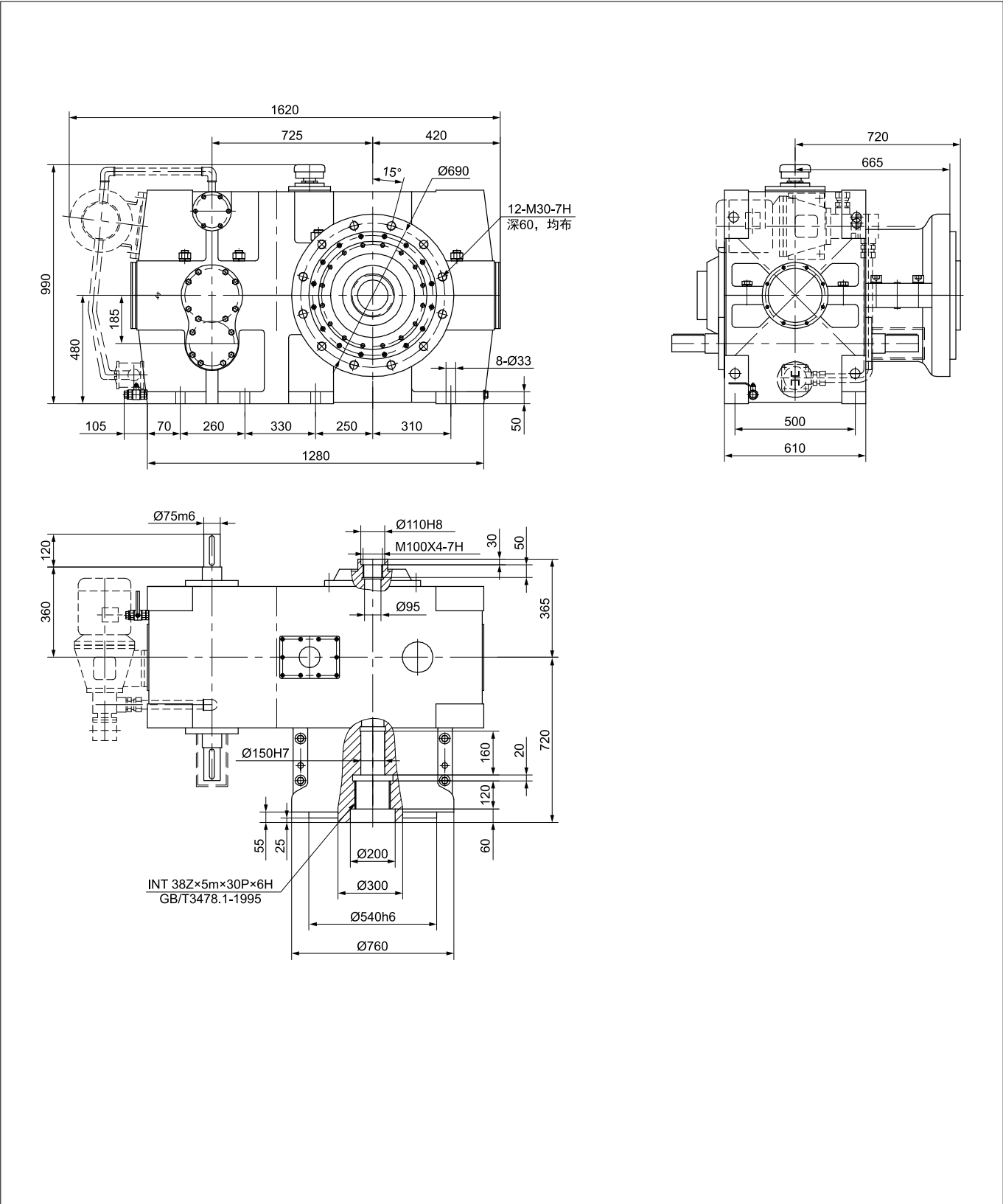
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJ250H 单螺杆热喂料无喂料座挤出机齿轮箱
(Size: DLJ250H)

DLJ250H gear units for single screw hot feed extruder
without feeding base (Size: DLJ250H)

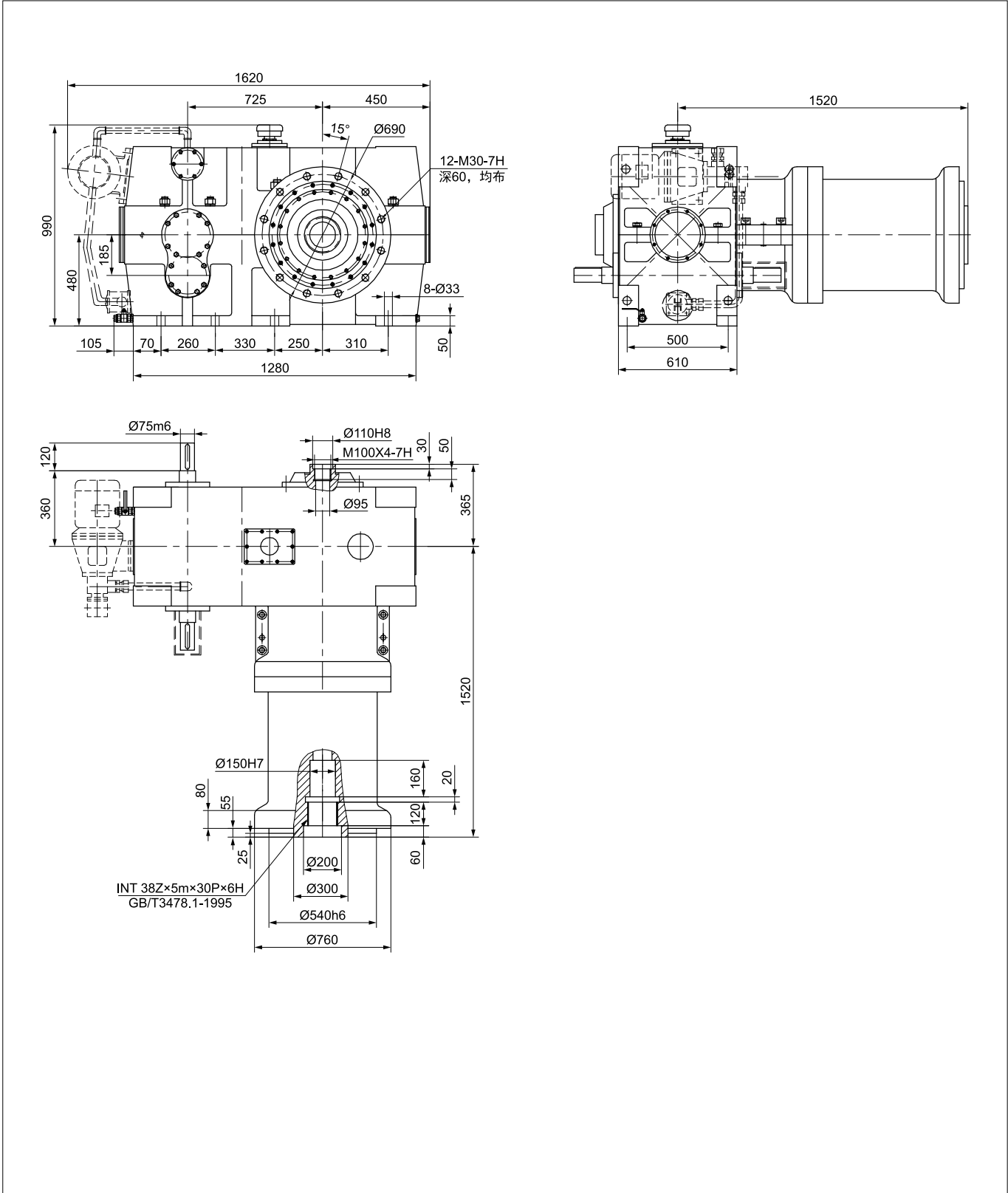
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ250H	DLJ250H-33.3-220-45-I/II	220	1500	45	3450
	DLJ250H-33.3-250-45-I/II	250	1500	45	



DLJ250HL 单螺杆热喂料无喂料座挤出机加长型齿轮箱
(Size: DLJ250HL)

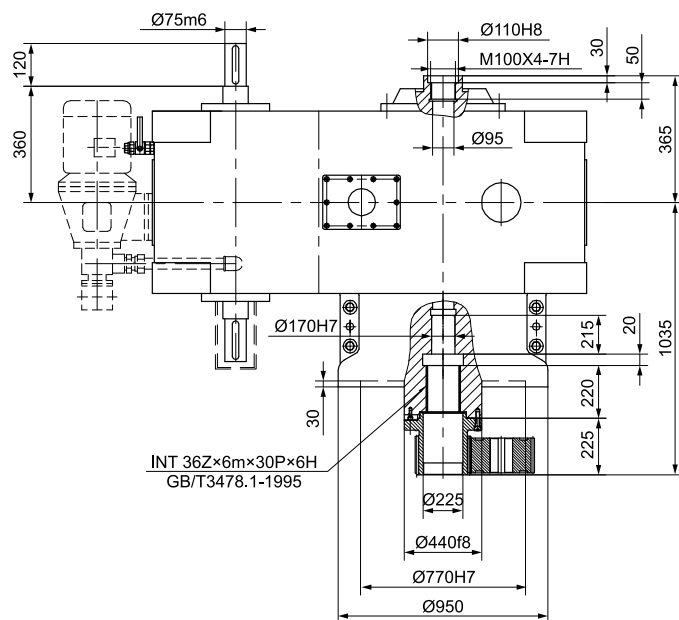
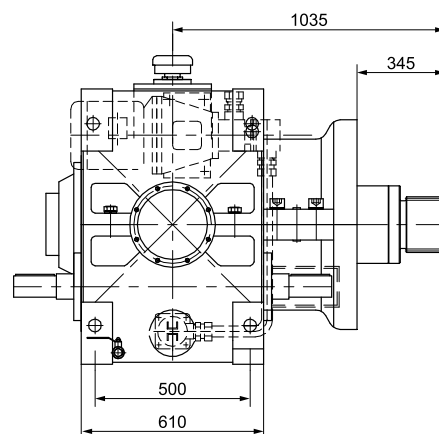
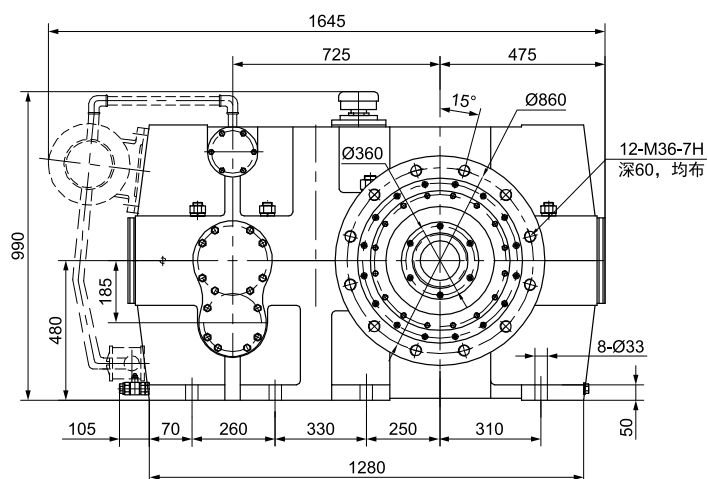
DLJ250HL lengthened gear units for single screw hot feeding extruder without feeding base (Size: DLJ250HL)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ250HL	DLJ250HL-33.3-220-45-I/II	220	1500	45	4650
	DLJ250HL-33.3-250-45-I/II	250	1500	45	



**DLJ250HW gear units for single screw hot feed extruder
with feed base (Size: DLJ250HW)**

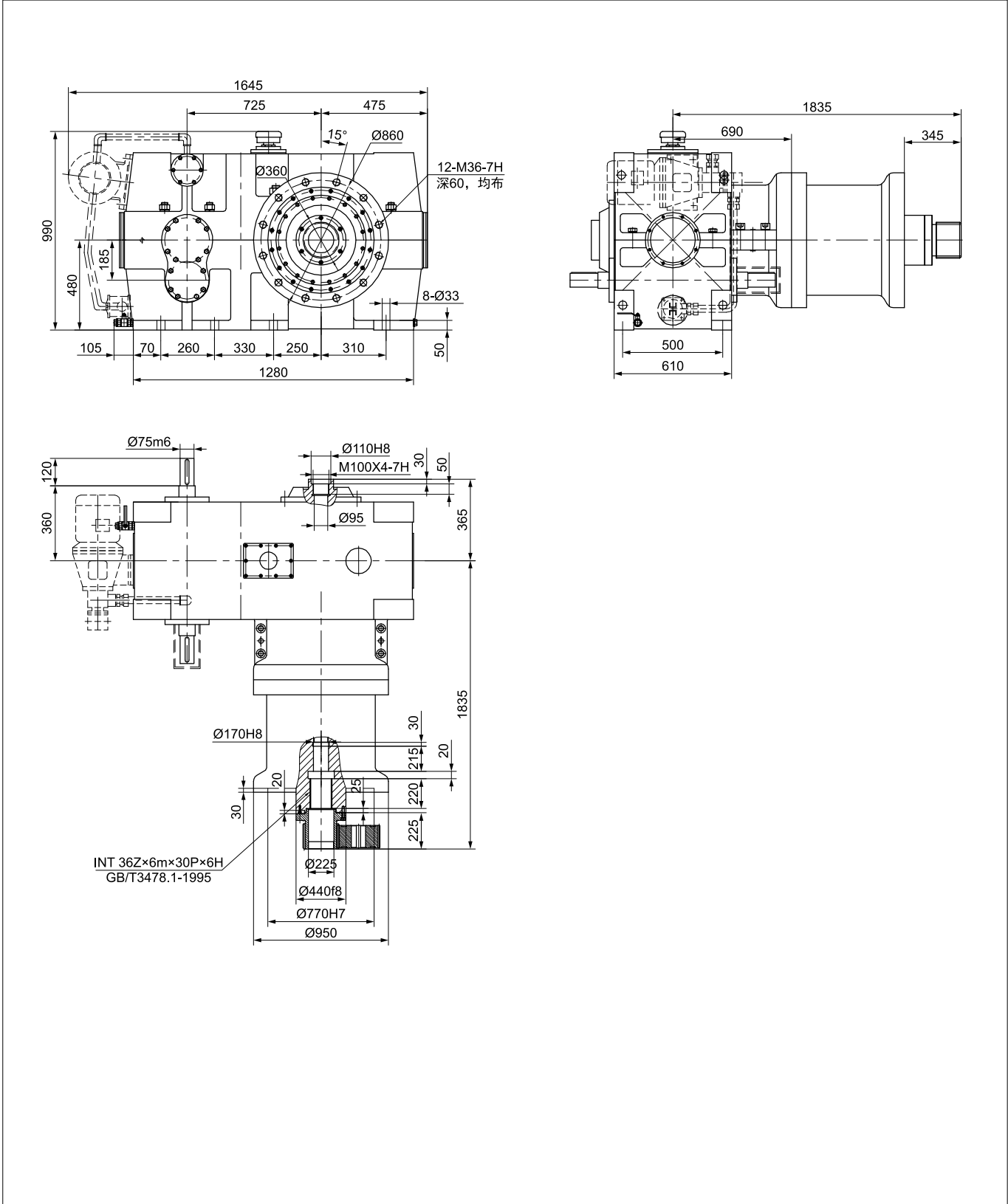
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ250HW	DLJ250HW-33.3-220-45-I/II	220	1500	45	3750
	DLJ250HW-33.3-250-45-I/II	250	1500	45	



DLJ250HWL 单螺杆热喂料带喂料座挤出机齿轮箱
(Size: DLJ250HWL)

DLJ250HWL gear units for single screw hot feed extruder with feed base (Size: DLJ250HWL)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJ250HWL	DLJ250HWL-33.3-220-45-I/II	220	1500	45	4900
	DLJ250HWL-33.3-250-45-I/II	250	1500	45	



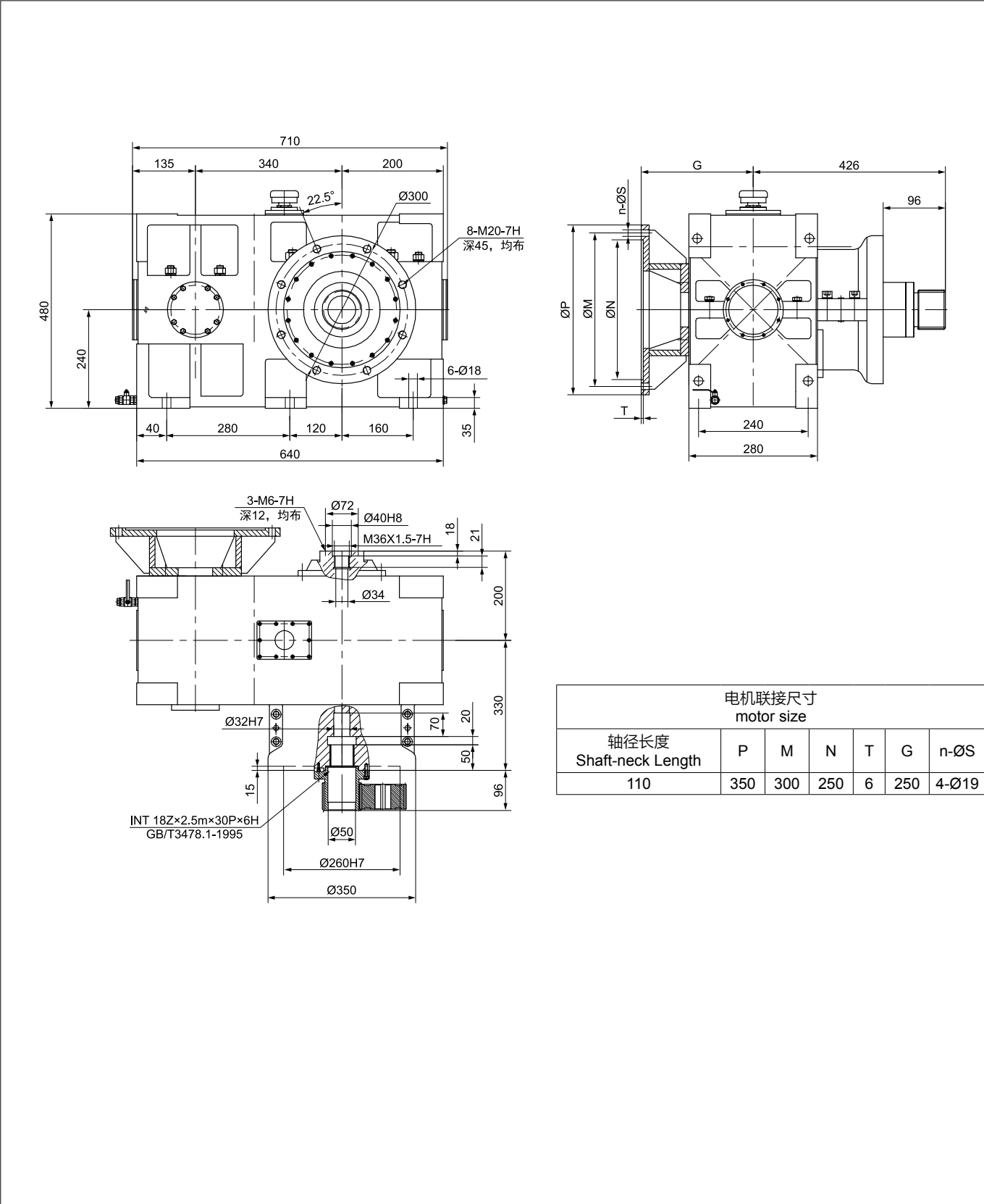
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF60 单螺杆冷喂料挤出机齿轮箱
(Size: DLJF60)

DLJF60 gear units for single screw cold feed extruder
(Size: DLJF60)

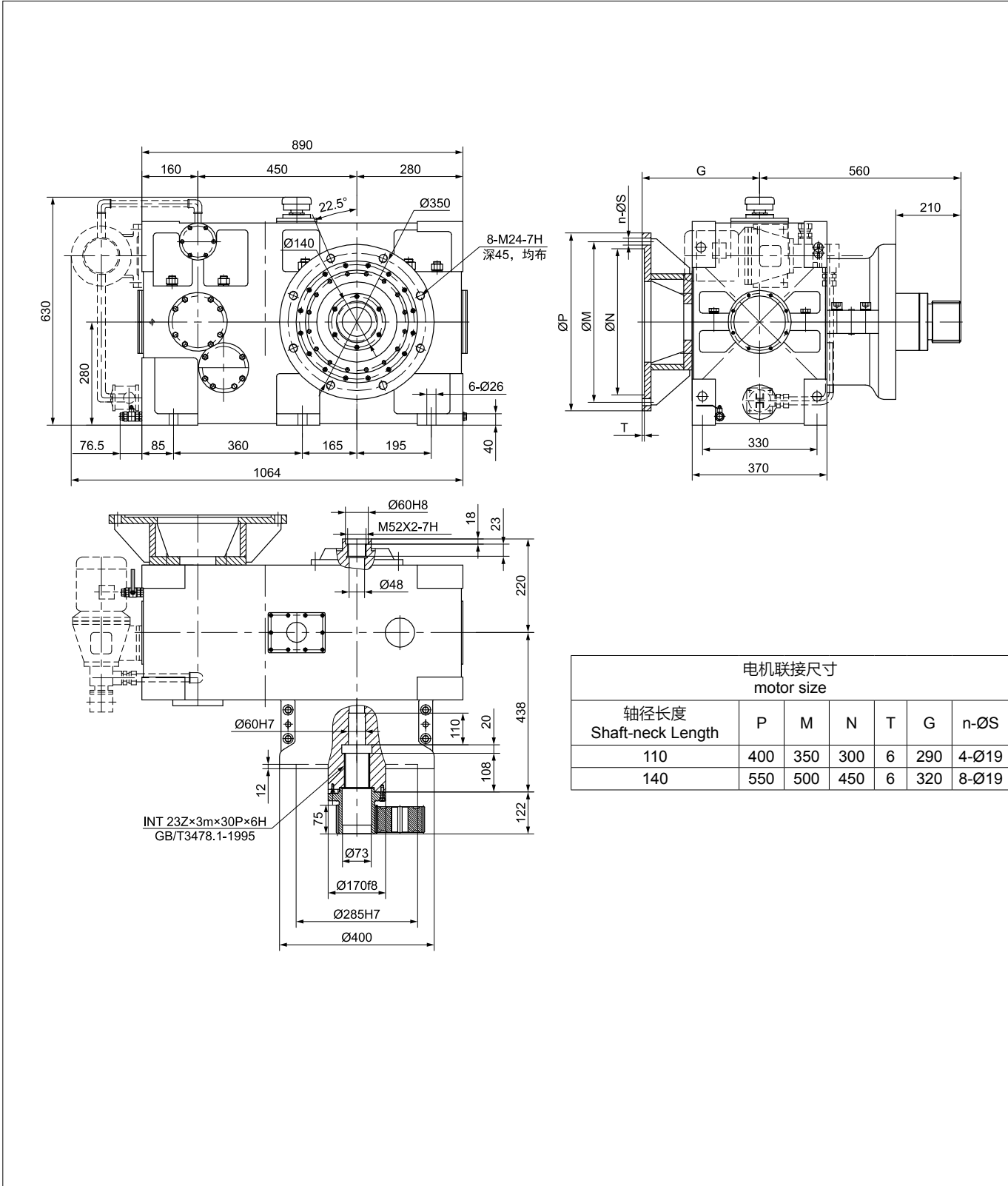
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF60	DLJF60-18.75-22-80-I/II	22	1500	80	450



DLJF90 单螺杆冷喂料挤出机齿轮箱
(Size: DLJF90)

DLJF90 gear units for single screw cold feed extruder
(Size: DLJF90)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF90	DLJF90-25-55-60-I/II	55	1500	60	900
	DLJF90-27.3-55-55-I/II	55	1500	55	
	DLJF90-30-55-50-I/II	55	1500	50	



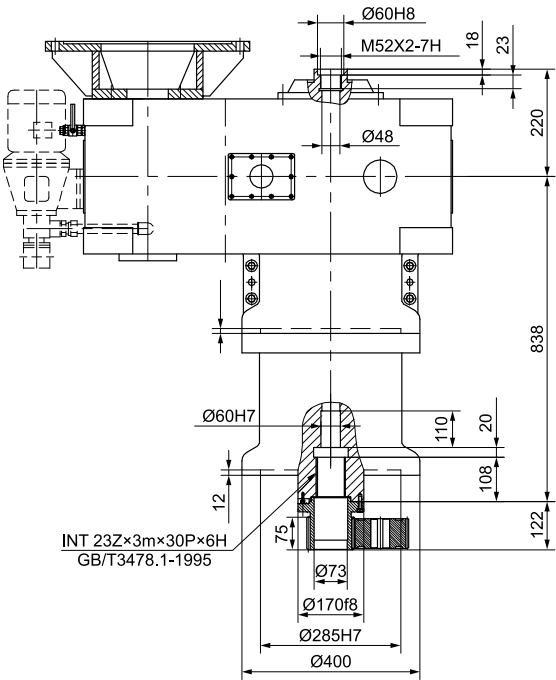
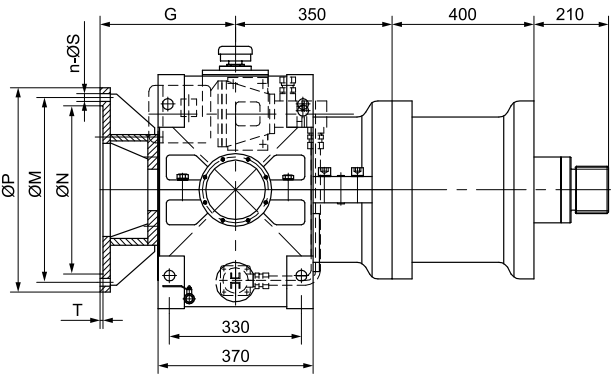
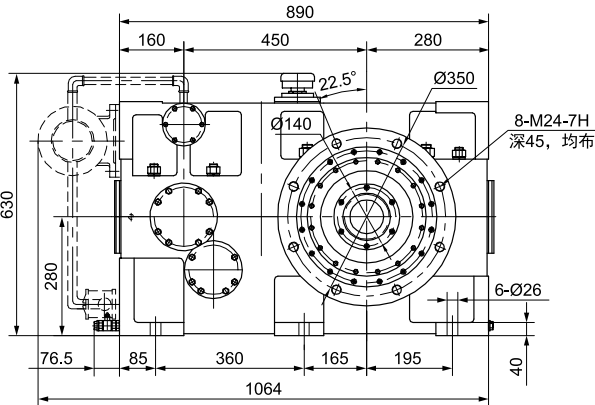
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF90L 单螺杆冷喂料挤出机加长型齿轮箱
(Size: DLJF90L)

DLJF90L lengthened gear units for single screw cold
feed extruder (Size: DLJF90L)

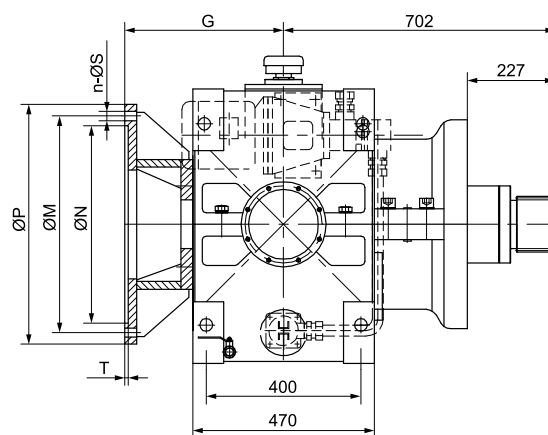
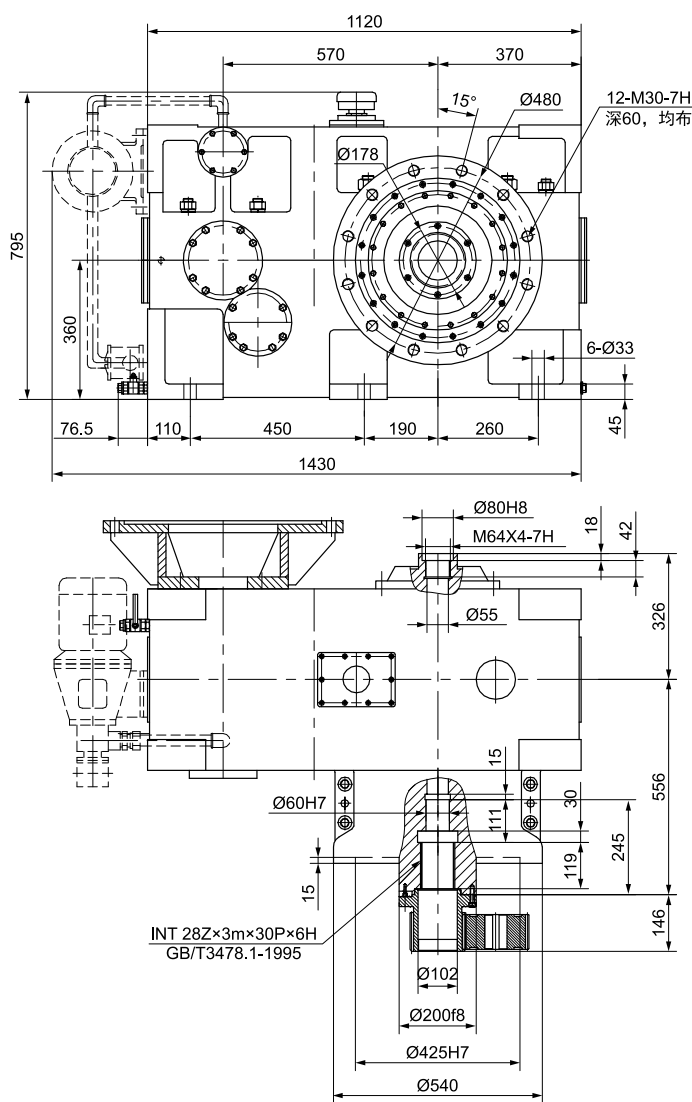
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF90L	DLJF90L-25-55-60-I/II	55	1500	60	1100
	DLJF90L-27.3-55-55-I/II	55	1500	55	
	DLJF90L-30-55-50-I/II	55	1500	50	



电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
110	400	350	300	6	290	4-Ø19
140	550	500	450	6	320	8-Ø19

**DLJF120 gear units for single screw cold feed extruder
(Size: DLJF120)**

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF120	DLJF120-30-90-50-I/II	90	1500	60	1650
	DLJF120-37.5-90-40-I/II	90	1500	55	
	DLJF120-30-110-50-I/II	110	1500	50	
	DLJF120-37.5-110-40-I/II	110	1500	50	



电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
140	450	400	350	6	380	8-Ø19
140	550	500	450	6	380	8-Ø19
170	660	600	550	8	410	8-Ø24

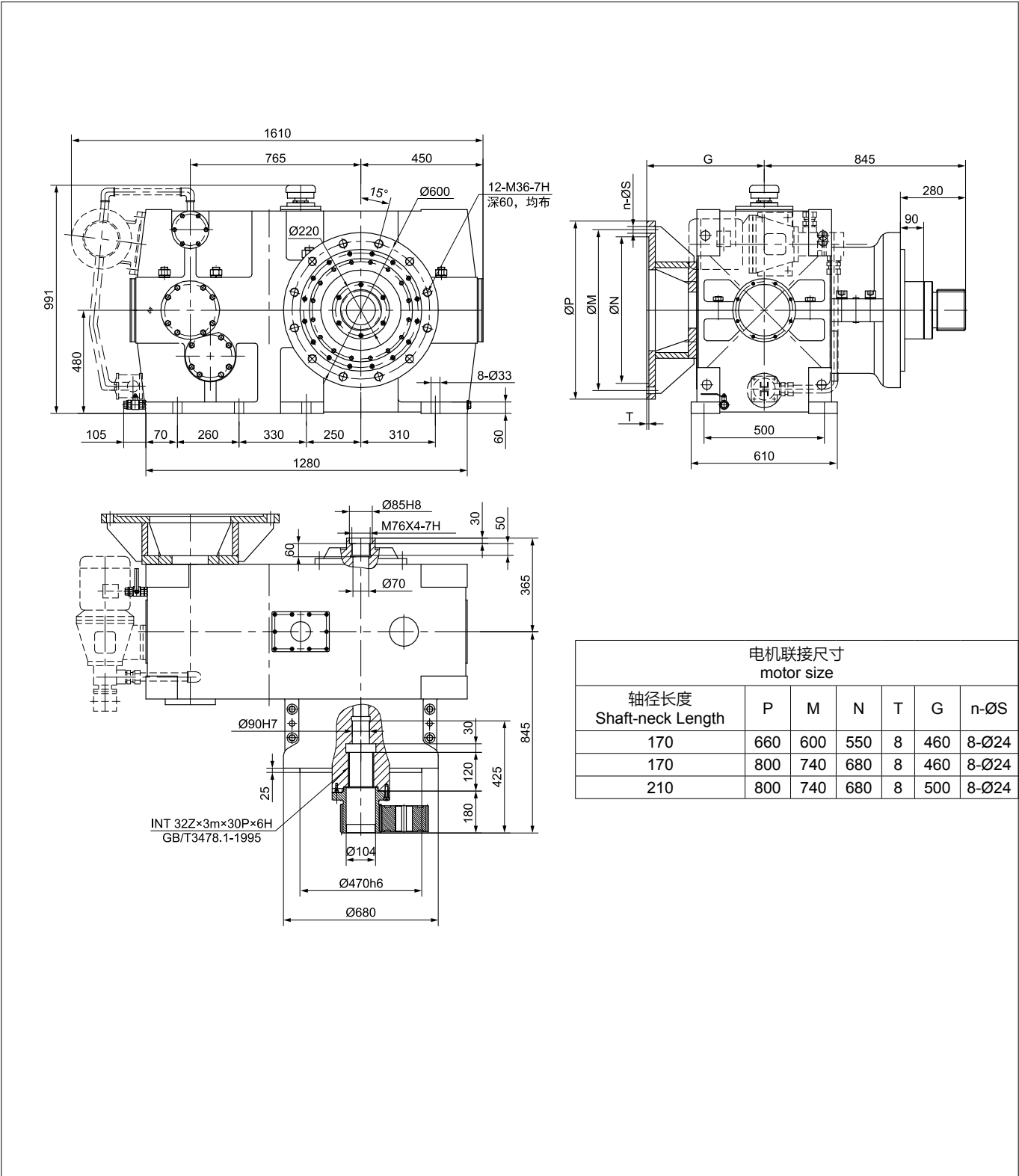
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF150 单螺杆冷喂料挤出机齿轮箱
(Size: DLJF150)

DLJF150 gear units for single screw cold feed extruder
(Size: DLJF150)

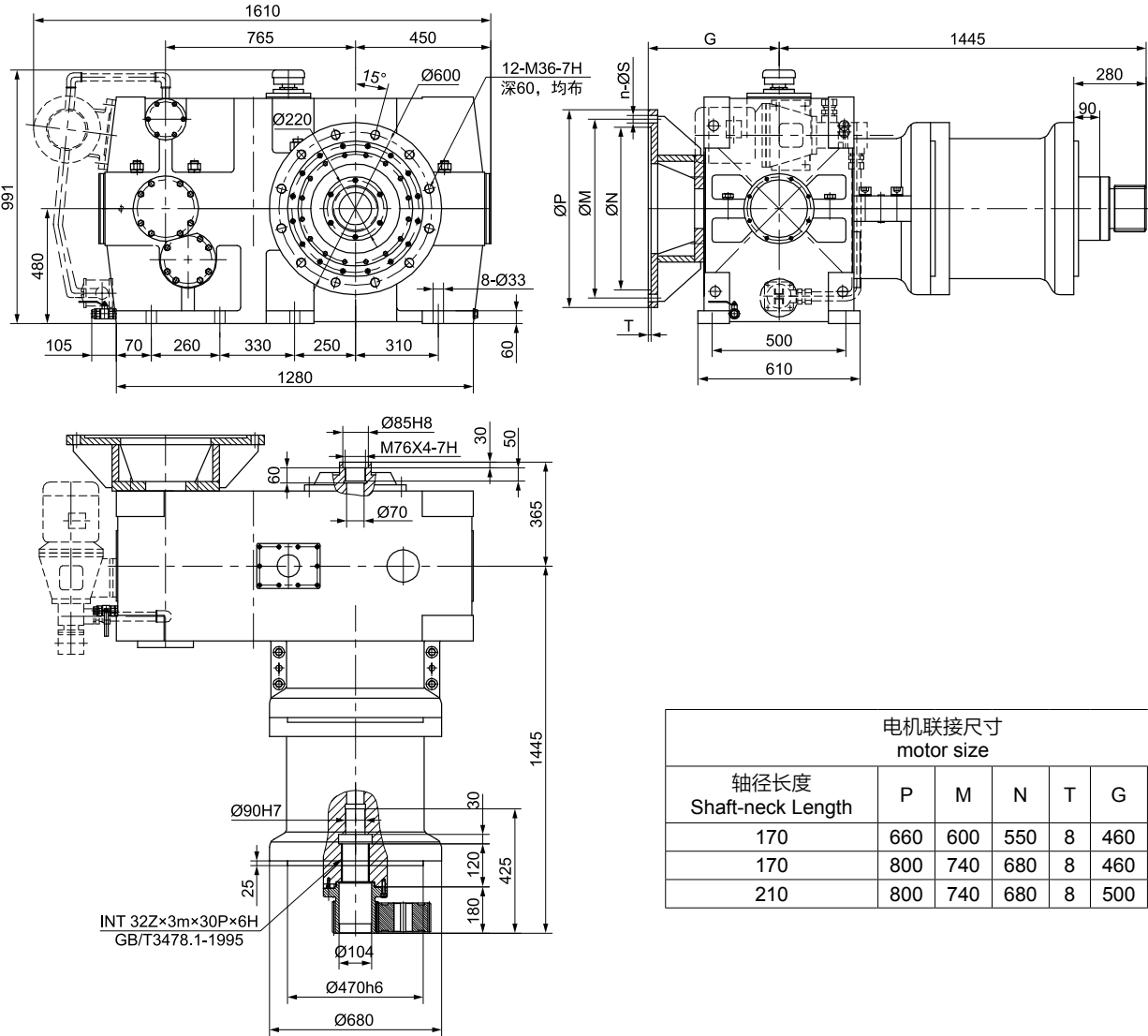
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF150	DLJF150-33.3-220-45-I/II	220	1500	45	3400
	DLJF150-37.5-220-40-I/II	220	1500	40	
	DLJF150-33.3-250-45-I/II	250	1500	45	
	DLJF150-37.5-250-40-I/II	250	1500	40	



DLJF150L 单螺杆冷喂料挤出机加长型齿轮箱
(Size: DLJF150L)

DLJF150L lengthen gear units for single screw cold feed extruder (Size: DLJF150L)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF150L	DLJF150L-37.5-250-40-I/II	250	1500	40	4300



电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
170	660	600	550	8	460	8-Ø24
170	800	740	680	8	460	8-Ø24
210	800	740	680	8	500	8-Ø24

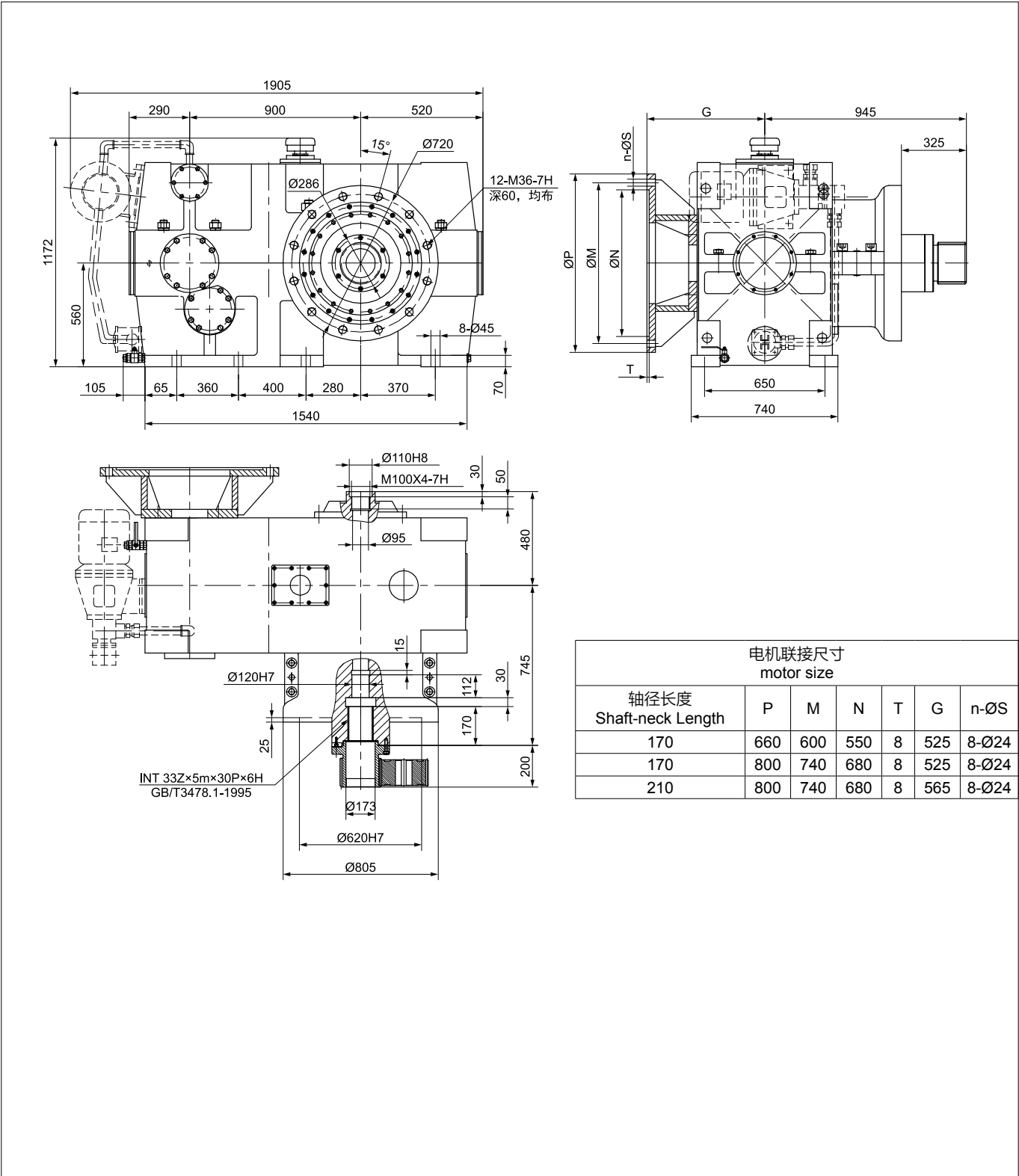
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF200 单螺杆冷喂料挤出机齿轮箱
(Size: DLJF200)

DLJF200 gear units for single screw cold feed extruder
(Size: DLJF200)

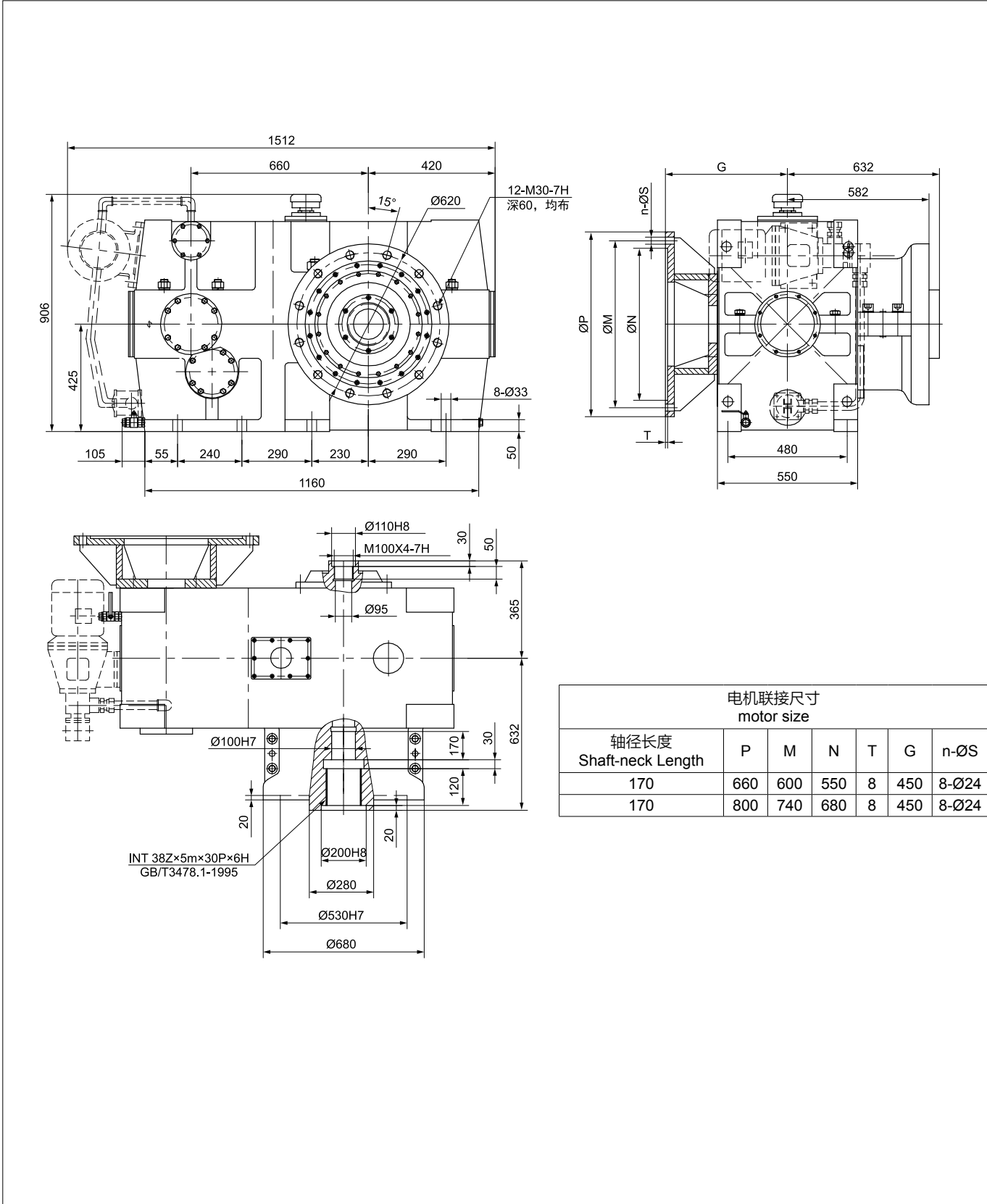
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF150	DLJF200-45.5-315-33-I/II	315	1500	33	5350
	DLJF200-53.6-315-28-I/II	315	1500	28	
	DLJF200-45.5-355-33-I/II	355	1500	33	
	DLJF200-53.6-355-28-I/II	355	1500	28	



DLJF200H 单螺杆热喂料无喂料座挤出机齿轮箱
(Size: DLJF200H)

DLJF200H gear units for single screw hot feed extruder
without feeder base (Size: DLJF200H)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF200H	DLJF200H-33.3-185-45-I/II	185	1500	45	3050



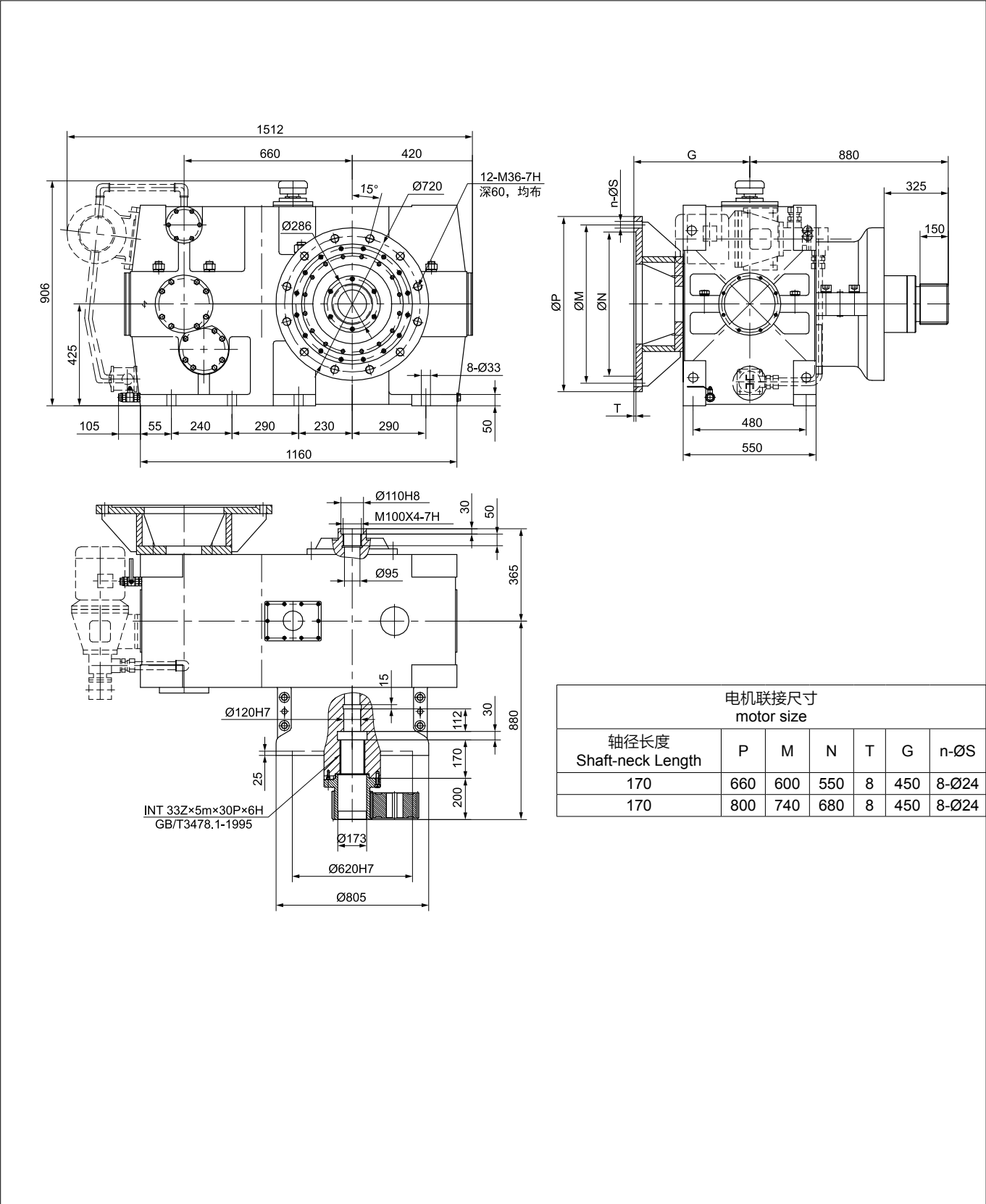
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF200HW 单螺杆热喂料带喂料座挤出机齿轮箱
(Size: DLJF200HW)

DLJF200HW gear units for single screw hot feed extruder with feed base (Size: DLJF200HW)

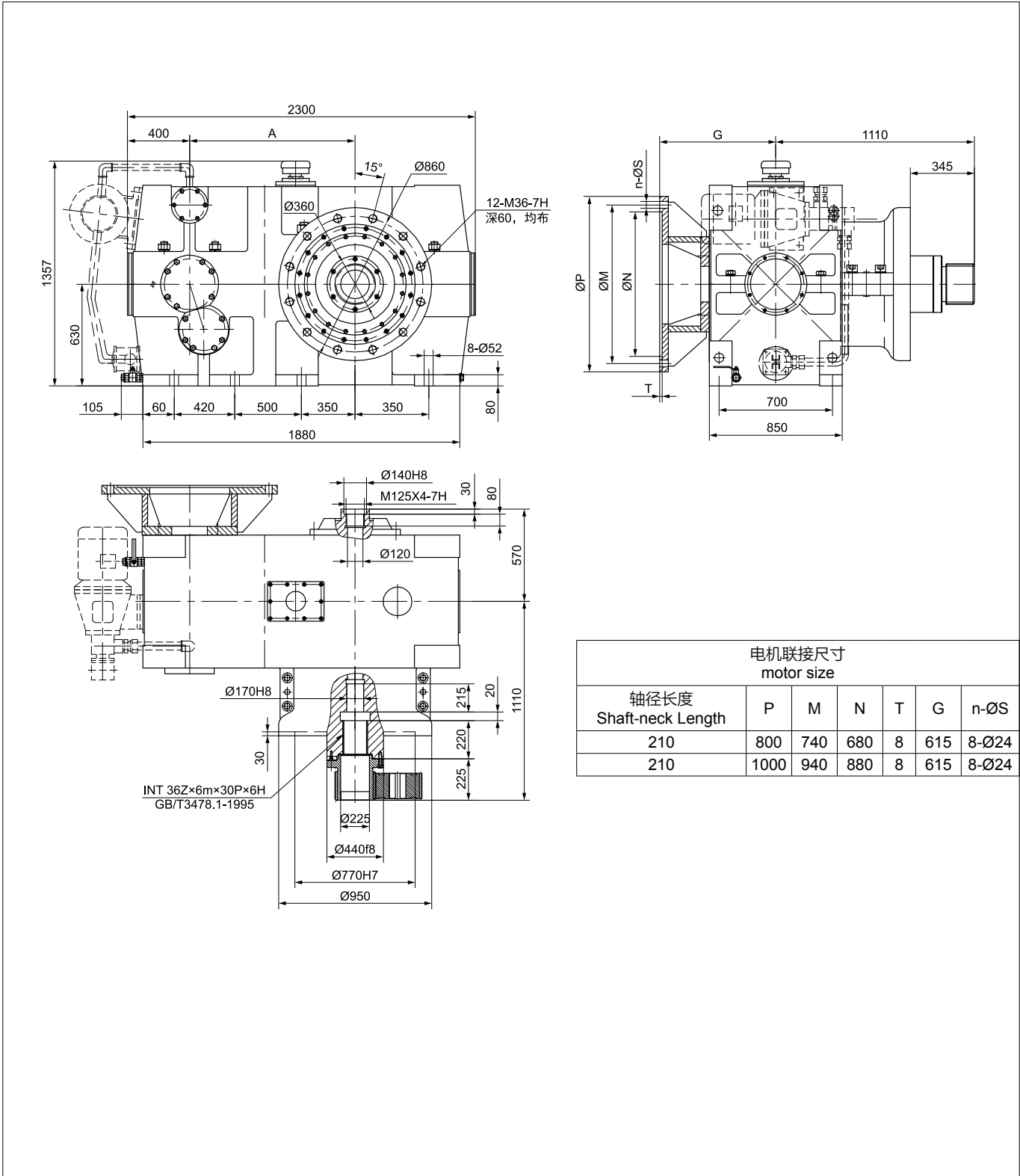
规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF200HW	DLJF200HW-33.3-185-45-I/II	185	1500	45	3100



DLJF250 单螺杆冷喂料挤出机齿轮箱
(Size: DLJF250)

DLJF250 gear units for single screw cold feed extruder
(Size: DLJF250)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	A	重量 Weight kg
DLJF250	DLJF250-38.5-500-26-I/II	500	1000	26	1050	8700
	DLJF250-50-500-20-I/II	500	1000	20	1170	9100
	DLJF250-38.5-450-26-I/II	450	1000	26	1050	8700
	DLJF250-50-450-20-I/II	450	1000	20	1170	9100



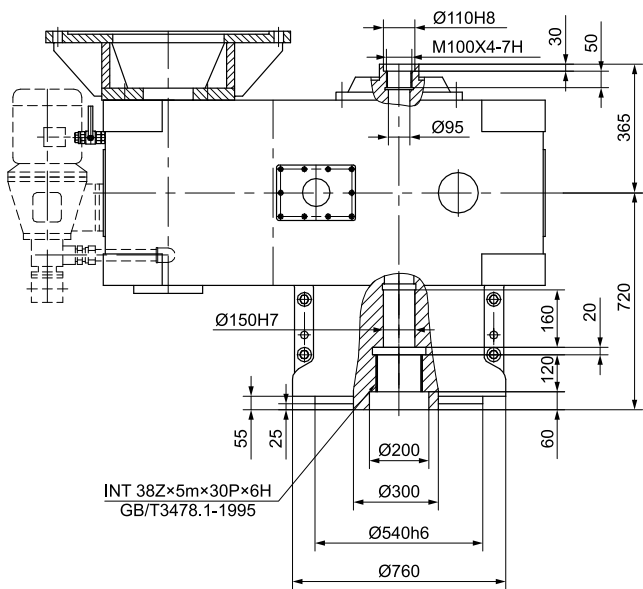
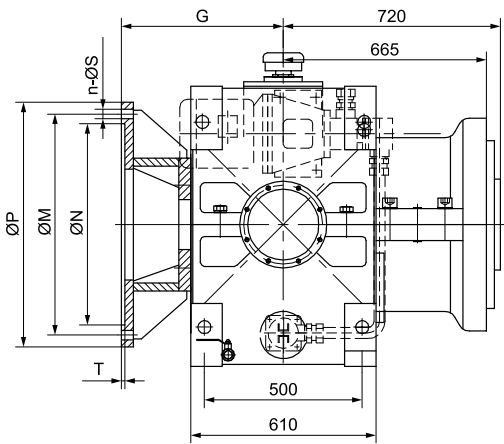
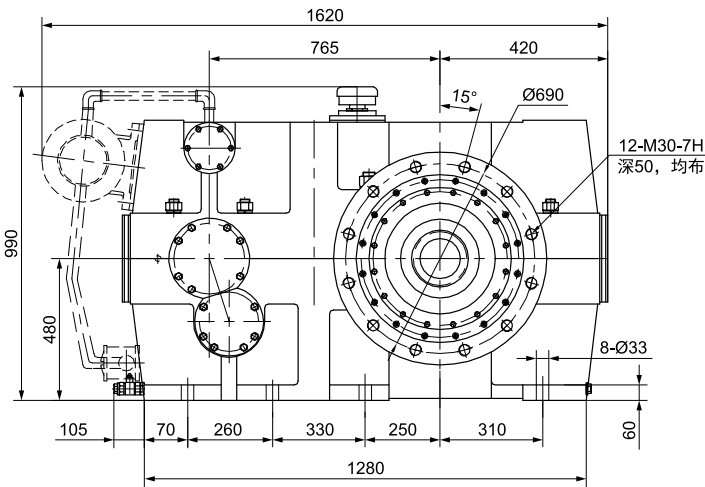
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF250H 单螺杆热喂料无喂料座挤出机齿轮箱
(Size: DLJF250H)

DLJF250H gear units for single screw hot feed extruder
without feeding base (Size: DLJF250H)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF250H	DLJF250H-33.3-220-45-I/II	220	1500	45	3750
	DLJF250H-33.3-250-45-I/II	250	1500	45	

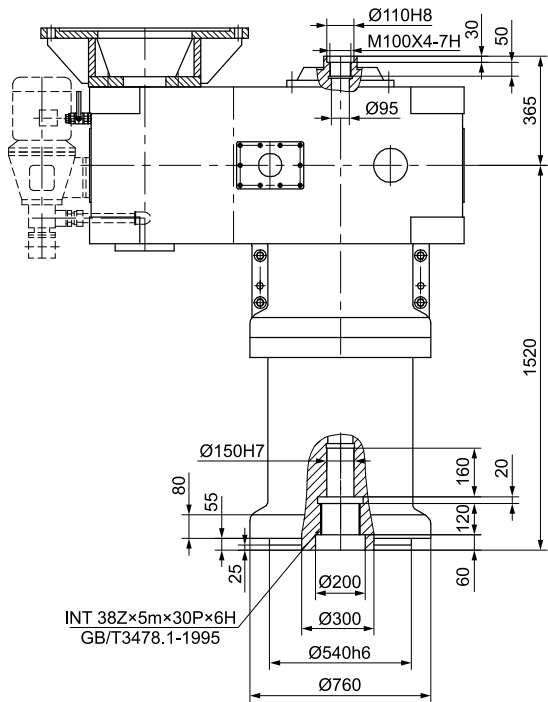
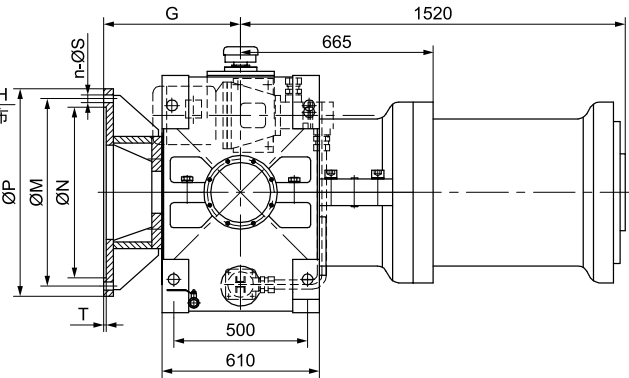
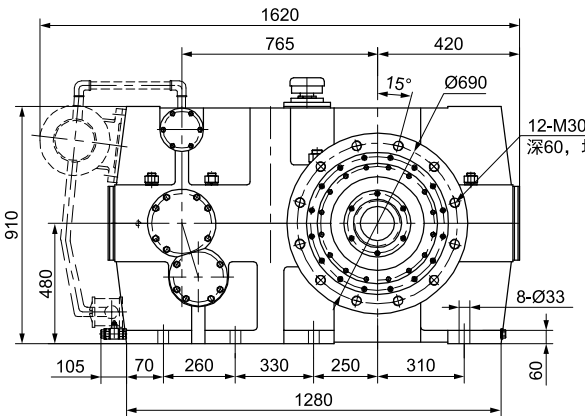


电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
170	660	600	550	8	460	8-Ø24
170	800	740	680	8	460	8-Ø24
210	800	740	880	8	500	8-Ø24

DLJF250HL 单螺杆热喂料无喂料座挤出机加长型齿轮箱
(Size: DLJF250HL)

DLJF250HL lengthened gear units for single screw hot feed extruder without feeder base (Size: DLJF250HL)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF250HL	DLJF250HL-33.3-220-45-I/II	220	1500	45	4980
	DLJF250HL-33.3-250-45-I/II	250	1500	45	



电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
170	660	600	550	8	460	8-Ø24
170	800	740	680	8	460	8-Ø24
210	800	740	680	8	500	8-Ø24

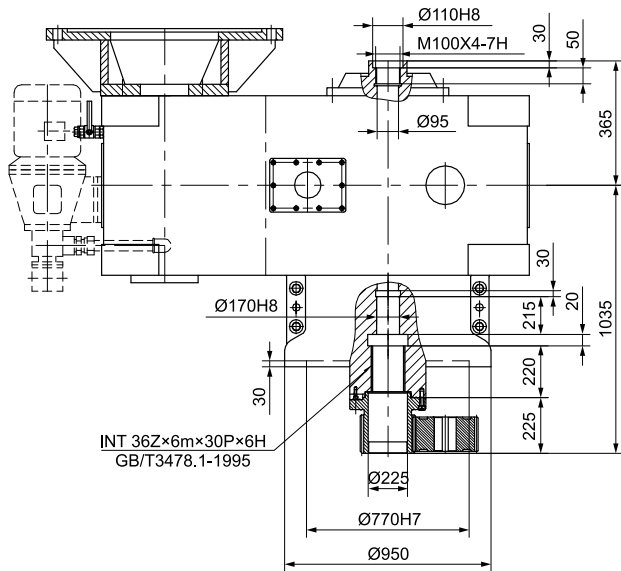
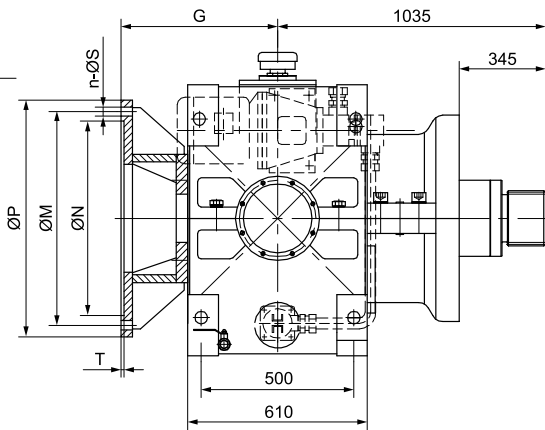
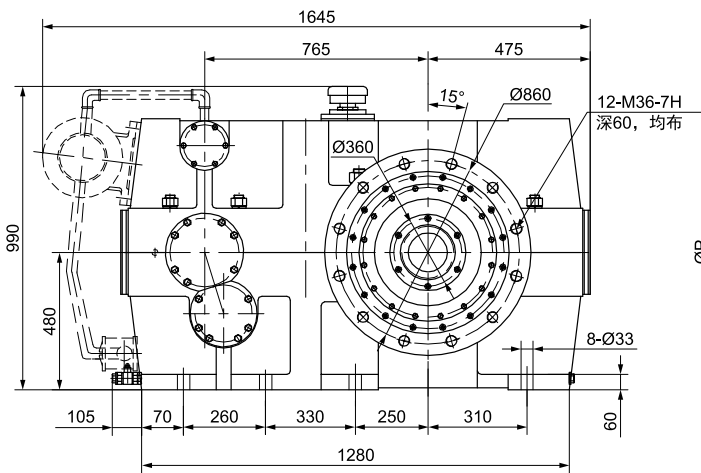
DLJ 单螺杆挤出机齿轮箱

DLJ Gear Units For Single Screw Extruder

DLJF250HW 单螺杆热喂料带喂料座挤出机齿轮箱
(Size: DLJF250HW)

DLJF250HW gear units for single screw hot feed extruder with feed base (Size: DLJF250HW)

规格 Size	产品编号 Designation	功率 Power kW	输入转速 Input speed rpm	输出转速 Output speed rpm	重量 Weight kg
DLJF250HW	DLJF250HW-33.3-220-45-I/II	220	1500	45	4070
	DLJF250HW-33.3-250-45-I/II	250	1500	45	



电机联接尺寸 motor size						
轴径长度 Shaft-neck Length	P	M	N	T	G	n-ØS
170	660	600	550	8	460	8-Ø24
170	800	740	680	8	460	8-Ø24
210	800	740	680	8	500	8-Ø24

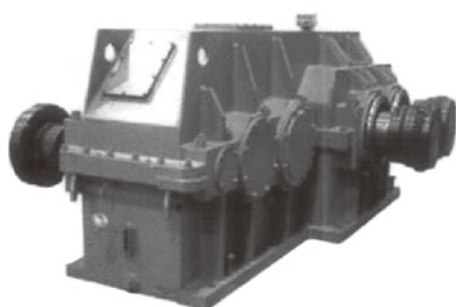
DLM 密炼机齿轮箱

DLM Gear Units For The Internal Mixer

5.1 概述

密炼机主齿轮箱是为密闭式炼胶机（以下简称密炼机）配套的主齿轮箱，是高精度重载荷硬齿面齿轮箱。密炼机主齿轮箱采用平行圆柱齿轮减速的传动形式。输入轴通过联轴器与电机轴相联，由电机驱动，经过齿轮减速和两输出轴之间齿轮的减速与功率分流，再通过联轴器把动力传递给密炼机转子轴，带动密炼机转子进行炼胶。

齿轮箱采用渐开线斜齿轮和滚动轴承，输入和输出密封结构采用油封和机械密封相结合的密封形式，保证密封安全可靠。润滑系统采用强制喷油润滑方式，小规格齿轮箱配有安装在齿轮箱箱体上的简易润滑装置，外观简洁美观，实用性强；大规格齿轮箱配独立稀油站润滑。

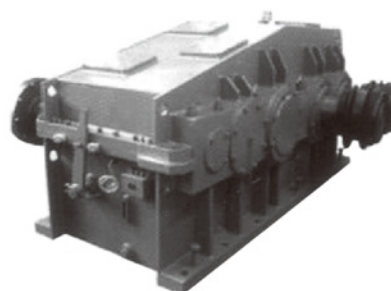


密炼机齿轮箱
Gear unit for Internal Mixer

5.1 General notes

The main gear unit, namely closed type rubber refining machine (for short Internal batch Mixer) is a kind of high precision, heavy duty and tooth-flank hardened product matched for main gear unit. For this gear unit, we adopt paralleled cylindrical gear to perform speed reducing. Through flexible coupling, the input shaft is connected to the motor shaft. Driven by the motor, reduced by parallel shafts and the gears between two output shafts and power dividing. The power now has been transmitted to rotor shaft of mixer by the crown coupling for the two output shafts separately. The two rotor shafts of the mixer refine rubber.

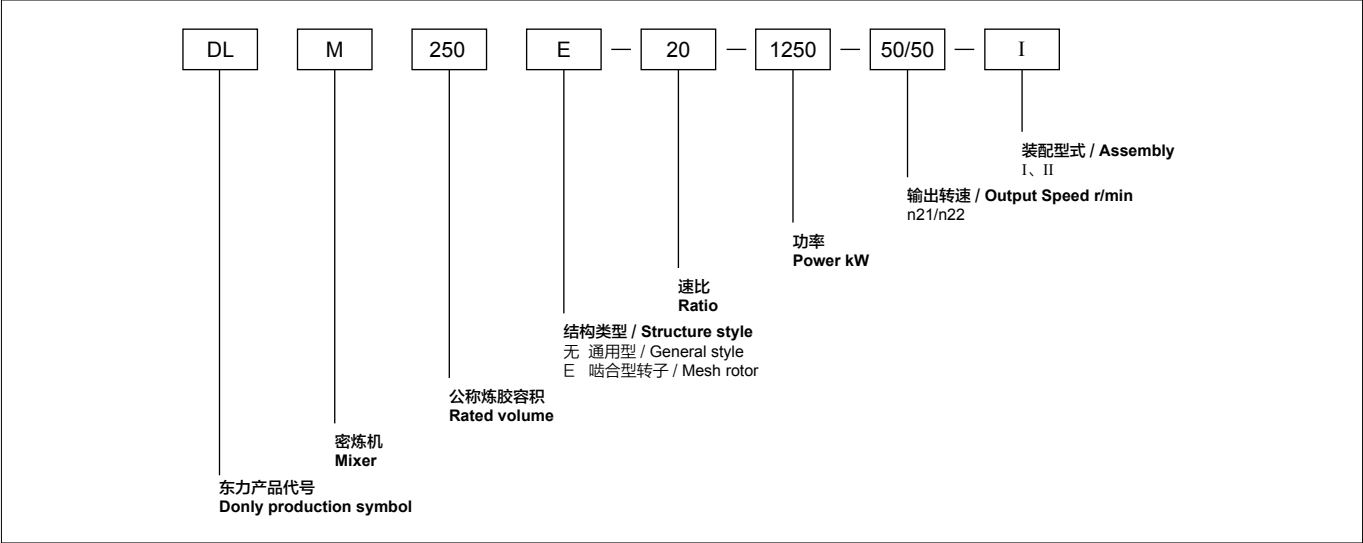
Gears in this gear unit are involutes helix gears. All supporting bearings are rolling bearing. The input and output shafts are sealed by seals together with mechanical parts to realize safe and reliable sealing. We adopt separate lubrication system, the equipment must be forcedly lubricated, the lubrication system may be erected as a separate oil unite or be installed outside the gear case. Simple lubrication device is installed outside the gear case, which provide separate pump and mainly be applied for small specification gear unit, external appearance of this kind of equipment is beauty and succinct. All the parts of the separate lubrication unite are assembled together, the pipe is used for connected the gear unit with the lubrication unit, which mainly be applied for large specification gear unit.



机械变速齿轮箱
Mechanical-shift Gear unit

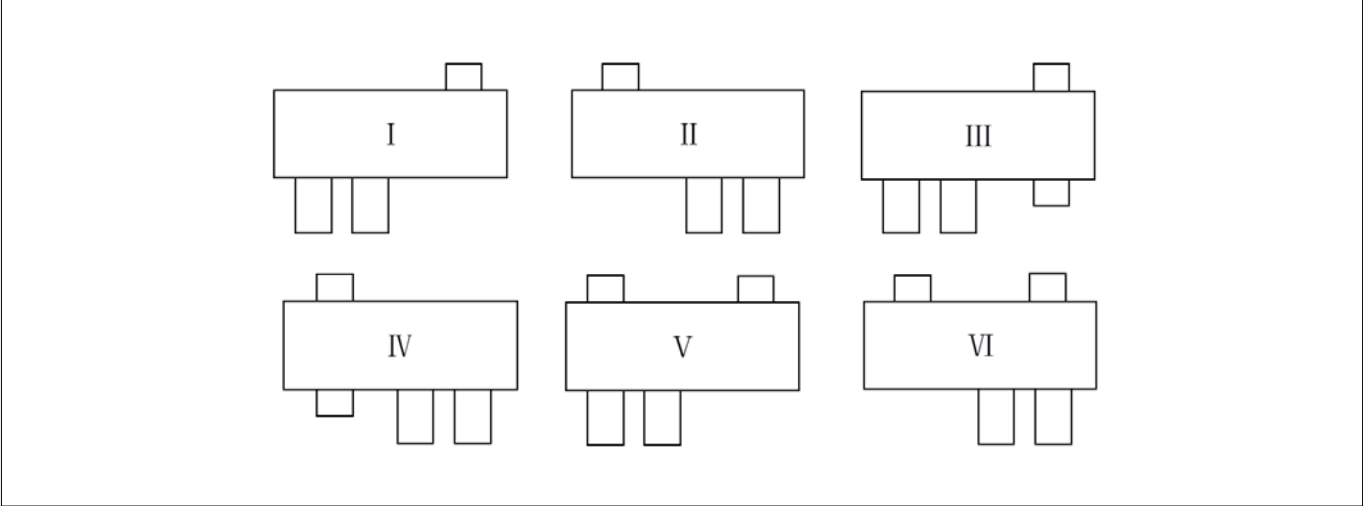
5.2 产品编号示例

5.2 Designation example



5.3 装配型式

5.3 Assembly



5.4 产品索引

5.4 Product index

型号 Type	产品编号 Designation	规格 Size	型号 Type	产品编号 Designation	规格 Size
1.5	DLM1.5-18-22-100/87-I/II	01	270	DLM270-25/50-1000/500-40/20-I/II	15
1.5	DLM1.5-15-30-100/87-I/II	02	270	DLM270-25-1100-40/36.2-I/II	16
5E	DLM5E-18.75-55-80/80-I/II	03	270	DLM270-25-1250-40/36.2-I/II	17
45E	DLM45E-16.67-280-60-60-I/II	04	270	DLM270-16.67-1500-60/54.4-I/II	18
50	DLM50-15-110-40/34.7-I/II	05	300	DLM300-25-1300-40/-I/II	19
75	DLM75-18.64-210-40/33.75-I/II	06	320E	DLM320E-20-1500-50/50-I/II	20
90E	DLM90E-16.67-630-60/60-I/II	07	320E	DLM320E-17.5-2*900-60/60-III/IV	21
110E	DLM110E-17.16-600-60/60-I/II	08	400	DLM400-16.7-2*1250-60/54.4-III/IV	22
110	DLM110-16.67-400-60/52.2-I/II	09	580E	DLM580E-22.2-2*1250-45/45-III/IV	23
135E	DLM135E-20-750-60/60-I/II	10	590	DLM590-20-800-50/50-I/II	24
160	DLM160-25/50-500/250-40/20-I/II	11	420	DLM420-16.625-2300-60/60-I/II	25
190E	DLM190E-16.67-1250-60/60-I/II	12	430	DLM430-16.67-2240-60/60-I/II	26
250E	DLM250E-20-1250-50/50-I/II	13	800	DLM800-20.249-1250-50/50-I/II	27
255	DLM255-25-1250-40/36.1-I/II	14			

DLM 密炼机齿轮箱

DLM Gear Units For The Internal Mixer

5.5 技术参数

5.5 Technical parameters

规格 Size	型号 Type	传动功率 Power	输入转速 Input speed rpm	输出转速 Output speed rpm	速比 Ratio	油量 Oil Volume L/min	重量 Weight kg
01	1.5	22	1800	100/87	18	—	280
02	1.5	30	1500	100/87	15	—	280
03	5E	55	1500	80/80	18.75	—	480
04	45E	280	1000	60/60	16.67	—	3200
05	50	110	600	40/34.7	15	10	1774
06	75	210	750	40/33.75	18.64	16	3000
07	90E	630	1000	60/60	16.67	40	5100
08	110E	600	1000	60/60	16.67	40	5460
09	110	400	1000	60/52.2	16.67	40	5300
10	135E	750	1200	60/60	20	63	7390
11	160	500/250	1000	40/20	25/50	80	8620
12	190E	1250	1000	60/60	16.67	80	11400
13	250E	1250	1000	50/50	20	100	13500
14	255	1250	1000	40/36.1	25	125	14500
15	270	1000/500	1000	40/20	25/50	100	15000
16	270	1100	1000	40/36.2	25	125	11900
17	270	1250	1000	40/36.2	25	125	13500
18	270	1500	1000	60/54.4	16.67	125	14900
19	300	1300	1000	40/40	25	125	15100
20	320E	1500	1000	50/50	20	125	15100
21	320E	2*900	1050	60/60	17.5	160	21000
22	400	2*1250	1000	60/54.4	16.67	160	22500
23	580E	2*1250	1000	45/45	22.2	160	27500
24	590	800	996	50/50	20	100	10500
25	420	2300	1000	60/60	16.625	160	20200
26	430	2240	1000	60/60	16.67	160	18750
27	800	1250	1000	50/50	20.249	160	19500

注:

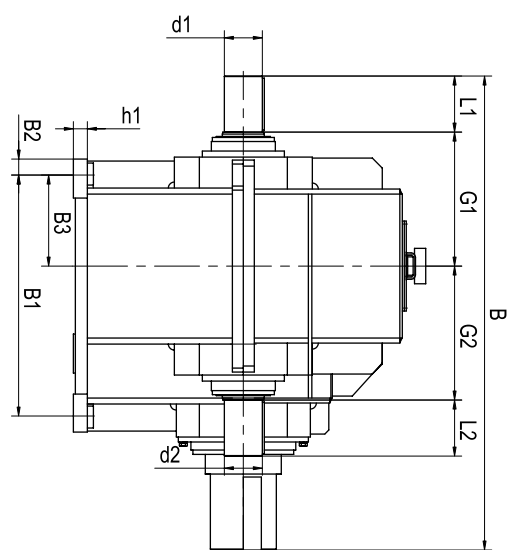
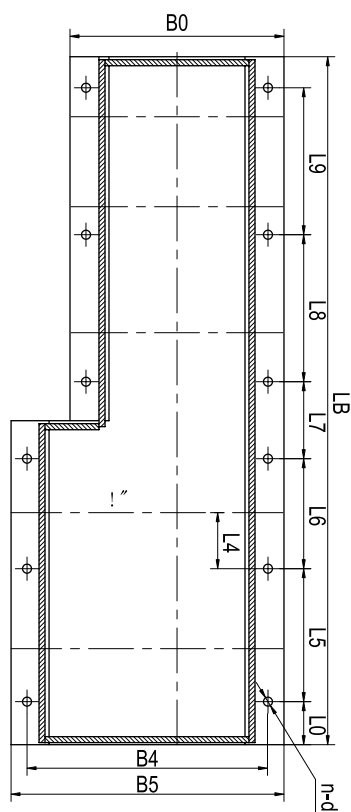
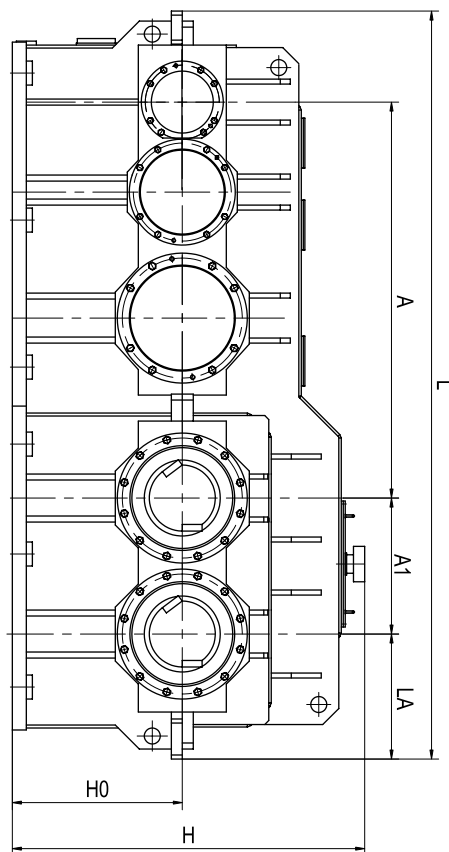
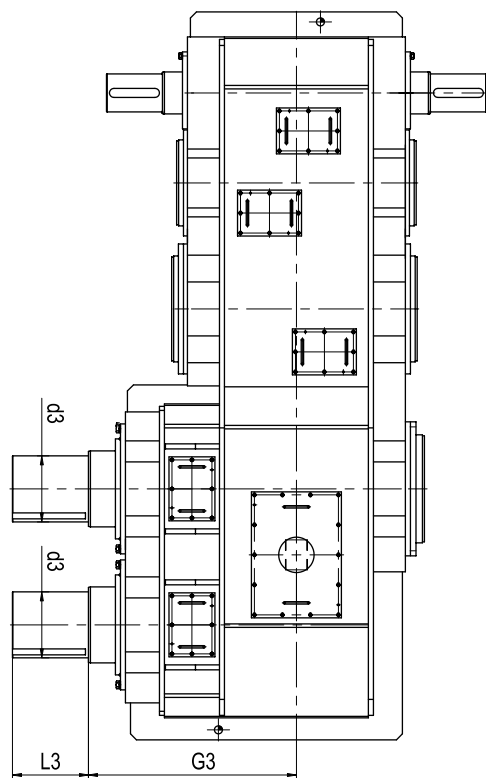
- 1: 功率 500/250 表示齿轮箱为机械变速;
2: 功率 2*900 表示齿轮箱有两台电机。

Note:

- 1: Power 500/250 indicates that the gear unit uses mechanical transmission;
2: Power 2*900 indicates there are two motors.

5.6 外形尺寸

5.6 Outline dimensions



DLM 密炼机齿轮箱

DLM Gear Units For The Internal Mixer

规格 Size	型号 Type	A	A1	B	B0	B1	B2	B3	B4	B5	n-d	d1	d2	d3	G1	G2	G3
01	1.5	260	120	555.5	380	310	35	155	310	380	4-19	48	—	52	213.5	—	220
02		305	120	555.5	400	350	25	175	350	400	4-19	48	—	52	215.5	—	220
03	5E	450	165	660	395	345	25	172.5	345	395	10-28	42	—	80	210	—	240
04	45E	780	340	1290	600	496	52	248	623	730	10-33	85	—	155	420	—	560
05	50	575	325	995	530	470	30	235	470	530	8-35	70	—	140	340	—	380
06	75	780	360	1210	540	460	40	230	600	680	10-35	85	—	170	360	—	510
07	90E	960	420	1458	880	790	45	395	790	880	10-35	110	—	190	525	—	560
08	110E	960	435	1458	880	790	45	395	790	880	10-35	110	—	210	525	—	560
09	110	860	440	1460	880	790	45	395	790	880	10-35	100	—	200	525	—	560
10	135E	1325	480	1595	800	660	70	330	830	970	10-45	100	—	220	480	—	700
11	160	1250	500	1740	840	720	60	360	870	990	12-42	120	—	230	510	—	690
12	190E	1330	530	1965	1150	1030	60	515	1030	1150	12-46	140	—	270	690	—	755
13	250E	1860	565	1865	860	740	60	370	980	1100	12-42	135	—	275	540	—	835
14	255	1680	612	1943	940	850	45	425	1070	1160	10-45	140	—	285	600	—	885
15	270	1480	565	1943	950	850	50	425	1070	1170	10-39	120	—	275	600	—	885
16	270	1480	565	1943	950	850	50	425	1070	1170	10-39	125	—	275	600	—	885
17	270	1680	565	1943	940	850	45	425	1070	1160	10-45	140	—	285	600	—	885
18	270	1680	565	2080	950	840	55	420	1150	1260	12-42	140	—	285	590	—	960
19	300	1760	615	2010	940	820	60	410	1085	1205	12-45	140	—	285	625	—	885
20	320E	1760	622	2010	940	820	60	410	1085	1205	12-45	140	—	285	625	—	885
21	320E	2210	622	1980	565	445	60	222.5	1110	1230	16-45	140	140	285	380	380	1130
22	400	2255	680	2340	1180	1030	75	515	1380	1530	14-45	150	150	300	700	700	1060
23	580E	2570	750	2520	1150	1000	75	500	1290	1440	12-45	150	150	360	750	750	1120
24	590	1325	750	1765	1040	900	70	450	900	1040	10-45	110	—	240	610	—	700
25	420	1980	680	2370	1070	910	80	455	1205	1365	12-45	190	—	330	670	—	1040
26	430	1875	700	2350	1060	900	80	450	1200	1360	12-45	180	—	330	670	—	1060
27	800	1570	860	2010	1200	1070	65	535	—	—	10-48	140	—	285	740	—	770

规格 Size	型号 Type	H	H0	h1	L	L0	L1	L2	L3	L4	L5	L6	L7	L8	L9	LA	LB
01	1.5	350	180	25	670	43.5	70	—	52	240	515	—	—	—	—	145	620
02		380	210	25	755	38.5	70	—	52	196.5	300	245	—	—	—	165	663
03	5E	540	315	42	900	50	80	—	130	55	230	170	160	250	—	315	915
04	45E	1060	500	45	1840	100	140	—	170	170	410	405	385	340	—	390	1740
05	50	950	380	45	1538	65	105	—	170	110	400	400	400	—	—	354	1330
06	75	1057	500	50	1840	100	130	—	210	185	355	355	355	355	—	390	1620
07	90E	1080	580	60	2230	100	163	—	210	210	530	450	450	540	—	450	2170
08	110E	1080	580	60	2180	65	163	—	210	210	530	450	450	540	—	410	2100
09	110	1060	560	60	2080	65	165	—	210	220	520	380	470	500	—	405	2000
10	135E	1252	600	60	2645	105	165	—	250	260	580	380	580	580	—	480	2530
11	160	1272	600	60	2540	90	210	—	330	250	480	480	160	480	480	460	2260
12	190E	1540	770	80	2970	95	200	—	320	385	500	500	500	500	500	590	2690
13	250E	1550	680	80	3370	142.5	200	—	290	282.5	565	607.5	775	460	400	550	3120
14	255	1600	700	80	3240	95	168	—	290	240	710	640	550	850	—	578	2950
15	270	1440	650	80	3050	100	168	—	290	290	710	640	550	850	—	585	2950
16	270	1440	650	80	3050	100	168	—	290	290	710	640	550	850	—	585	2950
17	270	1600	700	80	3200	45	168	—	290	290	710	640	550	850	—	585	2950
18	270	1580	760	80	3320	150	200	—	330	280	710	665	655	450	430	630	3210
19	300	1600	760	80	3350	105	200	—	300	340	630	610	400	570	645	605	3060
20	320E	1600	760	80	3350	105	200	—	300	340	630	610	400	570	645	598	3060
21	320E	1680	760	80	3860	95	170	170	300	311	749	690	660	540	450	533	3750
22	400	2030	1000	80	4010	79	200	200	380	259	806	599	481	585	627.5	625	3850
23	580E	2100	1000	120	4540	195	200	200	450	375	750	750	780	780	780	740	4200
24	590	1160	600	70	3030	105	165	—	290	790	700	600	600	—	—	610	2900
25	420	1760	850	100	3740	215	280	—	380	280	665	550	385	735	735	625	3440
26	430	1800	850	100	3705	160	240	—	380	350	670	670	240	730	730	625	3420
27	800	1525	750	70	3400	165	200	—	300	430	785	785	660	660	—	710	3180

6.1 概述

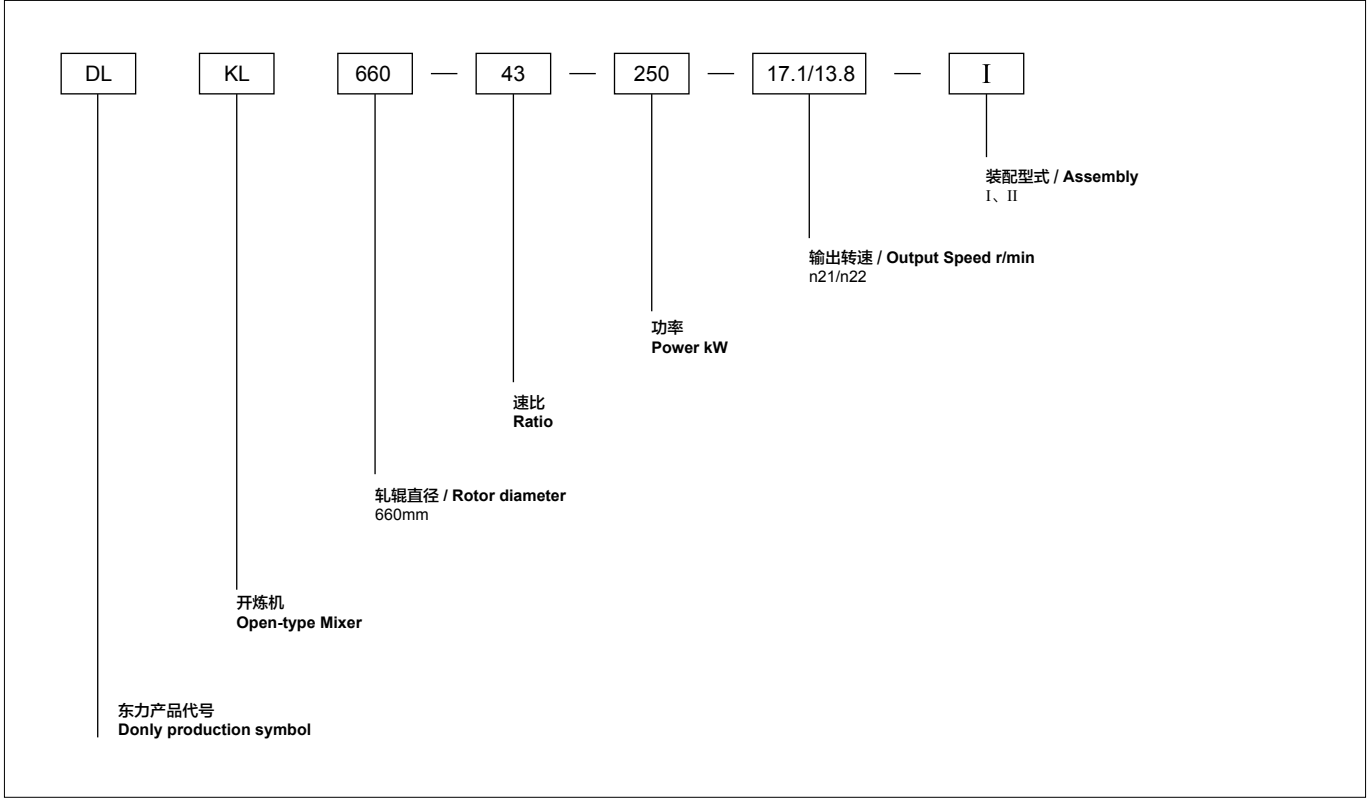
开炼机齿轮箱是为开放式炼胶机（简称开炼机）配套的主齿轮箱，是高精度重载荷硬齿面齿轮箱。齿轮箱采用平行圆柱齿轮减速的传动形式。输入轴通过弹性联轴器与电机轴相联，由电机驱动，经过齿轮减速和两输出轴之间齿轮的减速和功率分流，两输出轴分别通过联轴器把动力传递给开炼机转子轴，带动开炼机转子进行炼胶。

6.1 General notes

The main gear unit,namely Open-type mixing mill is a kind of high precision. Heavy duty and tooth-flank hardened product matched for main gear unit.For this gear unit,we adopt paralleled cylindrical gear to perform speed reduction,the input shaft is connected to the motor shaft through the flexible pin coupling. Driven by the motor, reduced by parallel shafts and power dividing between the two output shafts, two output shafts transfer the power to the rotor shaft of the roller mixing mill through the coupling, in such a manner,two rotor shafts of the roller mixing mill start to refine the rubber.

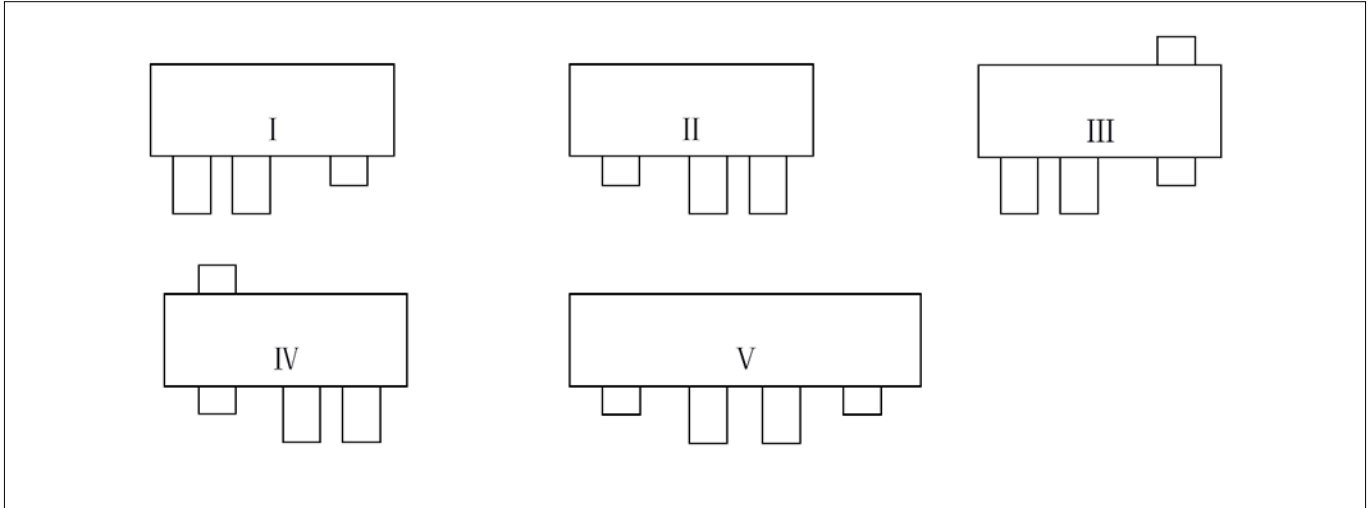
6.2 产品编号示例

6.2 Designation example



6.3 装配型式

6.3 Assembly



DLKL 开炼机齿轮箱

DLKL Gear Units For The Open Mill

6.4 产品索引

6.4 Product index

型号 Type	产品编号 Designation	规格 Size	型号 Type	产品编号 Designation	规格 Size
360	DLKL360-34.5-37-29/26.6-I/II	01	660	DLKL660-38.6-250-19.2/15.45-I/II	09
550	DLKL550-63-110-15.6/16.8-I/II	02	660	DLKL660-43-250-17.1/13.8-I/II	10
550	DLKL550-50-110-19.8/16.2-I/II	03	660	DLKL660-47.5-250-15.8/14.5-I/II	11
550	DLKL550-48.5-132-20.2/16.6-I/II	04	660	DLKL660-59-250-16.6/14.7-I/II	12
610	DLKL610-40.9-110-22/18.1-I/II	05	660	DLKL660-34.5-2*132-28.95/25.62-V	13
610	DLKL610-43.8-160-16.9/15.65-I/II	06	660	DLKL660-34.5-250-28.95/25.62-I/II	14
660	DLKL660-36.5-180-16/14.7-I/II	07	710	DLKL710-50-280-20/18.2-I/II	15
660	DLKL660-48.9-180-15/13.8-I/II	08	710	DLKL710-63-280-15.6/14.3-I/II	16

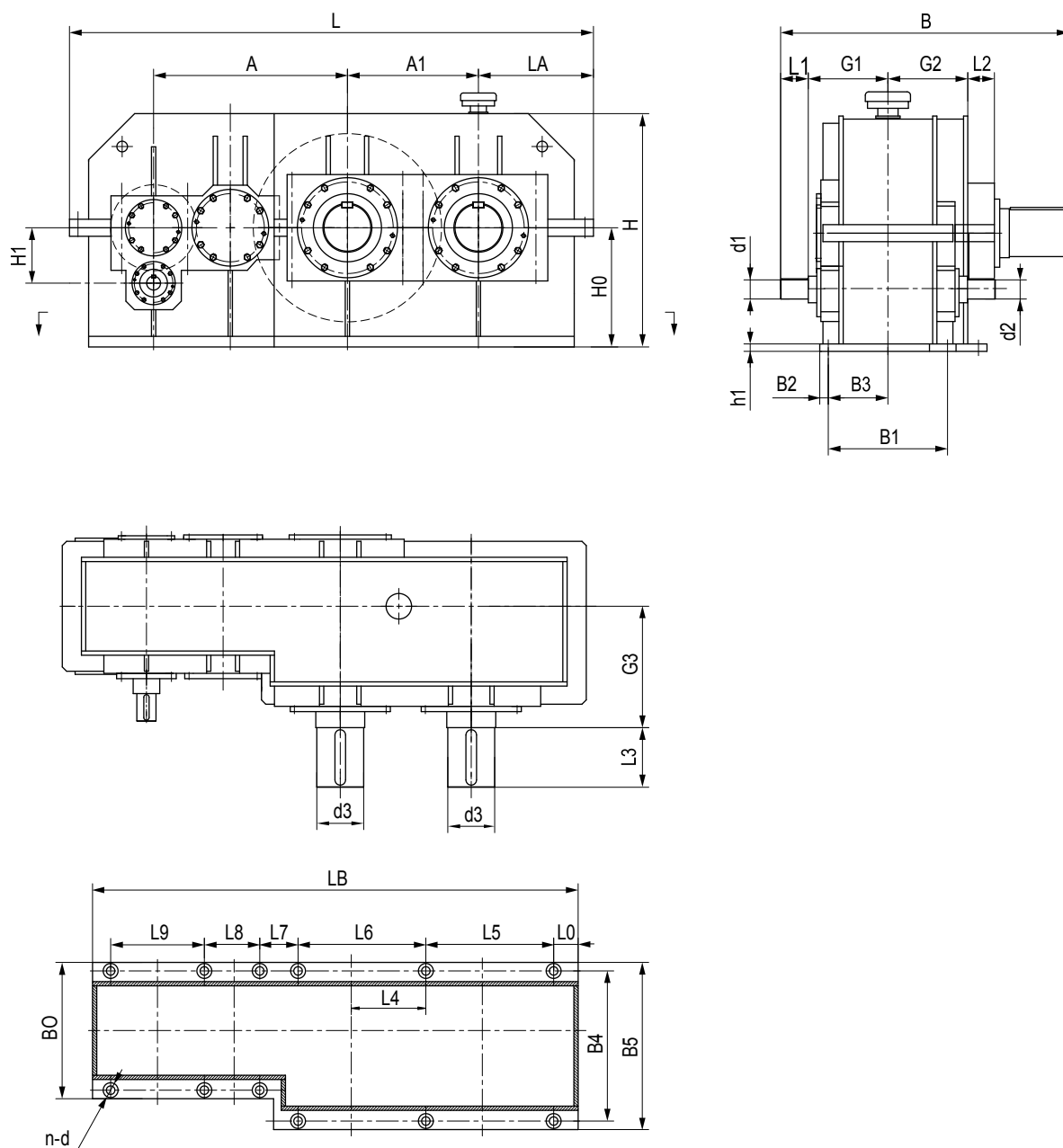
6.5 技术参数

6.5 Technical parameters

规格 Size	型号 Type	传动功率 Power	输入转速 Input speed rpm	输出转速 Output speed rpm	速比 Ratio	油量 Oil volume L/min	重量 Weight kg
01	360	37	1000	29/26.6	34.5	—	1250
02	550	110	980	15.6/16.8	63	16	3800
03	550	110	980	19.8/16.2	50	16	3070
04	550	132	980	20.2/16.6	48.5	16	3750
05	610	110	900	22/18.1	40.9	25	4050
06	610	160	740	16.9/15.65	43.8	25	5750
07	660	180	585	16/14.7	36.5	40	7500
08	660	180	734	15/13.8	48.9	40	6300
09	660	250	740	19.2/15.45	38.6	40	7500
10	660	250	735	17.1/13.8	43	40	8344
11	660	250	750	15.8/14.5	47.5	40	8220
12	660	250	980	16.6/14.7	59	40	8200
13	660	2*132	1000	28.95/25.62	34.5	40	4300
14	660	250	1000	28.95/25.62	34.5	40	5640
15	710	280	1000	20/18.2	50	63	9550
16	710	280	1000	15.6/14.3	63	63	9920

6.6 外形尺寸

6.6 Outline dimensions



DLKL 开炼机齿轮箱

DLKL Gear Units For The Open Mill

规格 Size	型号 Type	A	A1	B	B0	B1	B2	B3	B4	B5	n-d	d1	d2	d3	G1	G2	G3
01	360	660	365	—	570	490	40	245	490	570	6-33	—	42	120	—	320	350
02	550	995	550	—	710	630	40	315	630	710	10-40	—	80	180	—	455	500
03	550	730	555	1000	666	566	50	283	566	666	10-35	75	75	180	395	395	410
04	550	880	555	—	690	615	37.5	307.5	615	690	10-39	—	80	180	—	380	385
05	610	910	615	—	710	630	40	315	630	710	10-35	—	70	170	—	425	470
06	610	1240	620	—	820	720	50	360	720	820	10-35	—	100	250	—	550	580
07	660	1240	665	—	980	880	50	440	880	980	10-42	—	80	240	—	550	580
08	660	1240	665	—	980	860	60	430	860	980	10-39	—	100	250	—	550	580
09	660	1240	665	—	980	880	50	440	880	980	10-42	—	80	240	—	550	580
10	660	1228	665	—	780	660	60	330	870	990	12-39	—	100	250	—	460	700
11	660	1228	665	—	780	660	60	330	870	990	12-39	—	100	250	—	460	700
12	660	1110	665	—	1020	900	60	450	900	1020	8-52	—	110	260	—	165	380
13	660	880	665	—	560	470	45	235	470	560	16-40	—	70	180	—	370	420
14	660	1240	665	—	710	630	40	315	630	710	10-46	—	80	180	—	460	500
15	710	1145	715	—	870	760	55	380	955	1065	10-48	—	100	260	—	520	735
16	710	1145	710	1745	960	860	50	430	860	960	10-48	100	100	280	600	600	670

规格 Size	H	H0	H1	h1	L	L0	L1	L2	L3	L4	L5	L6	L7	L8	L9	LA	LB
01	645	340	—	35	1490	145	—	70	200	-120	600	600	—	—	—	310	1390
02	980	530	—	60	2200	85	—	100	250	355	470	470	470	470	—	435	2050
03	880	480	210	50	2040	80	105	105	270	280	570	430	430	300	—	450	1890
04	980	500	250	40	2200	115	—	170	300	285	520	520	450	350	—	440	2050
05	950	500	—	60	2250	70	—	105	240	325	600	560	400	360	—	475	2060
06	1105	580	—	60	2550	65	—	210	330	350	560	560	560	560	—	430	2370
07	1190	630	—	60	2700	170	—	140	320	355	560	560	560	560	—	520	2500
08	1190	630	—	60	2690	90	—	210	330	355	640	560	560	560	—	520	2500
09	1190	630	—	60	2700	170	—	140	320	355	560	560	560	560	—	520	2500
10	1550	800	281	80	2835	100	—	210	330	330	665	610	300	500	400	510	2675
11	1550	800	281	80	2835	100	—	210	330	330	665	610	300	500	400	510	2675
12	1210	600	320	90	2680	—	—	165	380	325	650	780	800	—	—	495	2540
13	1080	630	—	60	2820	90	—	180	210	152.5	360	360	360	360	360	197.5	2700
14	1182	630	—	60	2670	100	—	180	210	400	580	580	580	580	—	460	2520
15	1500	800	335	70	2945	150	—	165	400	395	675	675	555	555	—	595	2765
16	1462	710	340	70	2900	90	125	125	350	630	630	630	630	—	—	560	2700

7.1 概述

挤出压片机齿轮箱是为密炼机下辅机（双锥双螺杆挤出压片机组）配套的主齿轮箱，由挤出机齿轮箱和压片机齿轮箱组成，为高精度重载硬齿面齿轮箱。挤出压片机主齿轮箱共有五组传动形式，每组传动形式又分为左、右两种传动方式。

挤出机齿轮箱（A型）包括左、右两套齿轮箱（各含方箱、锥箱一台），其中一台锥箱的输入轴由弹性联轴器与电机联接。两锥箱输入轴通过万向联轴器联接，分别通过锥齿轮换向、两级平行轴齿轮减速，两输出轴（空心轴）得到相同的输出转速，异向同步转动，并分别带动挤出机啮合型螺杆工作。

挤出机齿轮箱（B型）输入轴由弹性联轴器与电机联接，经过三级平行轴齿轮减速，输出轴（空心轴）得到输出转速，挤出机转子轴伸安装到空心轴里，由空心轴将运动和动力传递给工作机转子轴，再通过一对锥齿轮分流，分别带动挤出机啮合型螺杆工作。

挤出机齿轮箱（C型）和压片机齿轮箱（D型）的输入轴由弹性联轴器与电机联接，经过三级平行轴齿轮减速，输出轴 I 得到输出转速 n_1 ，再经过两输出轴之间相同齿数齿轮的功率分流，输出轴 II 得到相同输出转速 n_2 。两输出轴分别由万向联轴器与工作机转子轴相连，两工作机转子轴以异向同步转速工作。

压片机齿轮箱（E型）输入轴由弹性联轴器与电机联接，经过三级平行轴齿轮减速，输出轴得到输出转速，由鼓形齿联轴器传递给压片机转子轴。

7.1 General notes

The main gear unit ,namely the bipyramid twin screw extruding and sheeting machine group (for short Extruding &Sheeting Machine) is a king of high precision, heavy duty and tooth-flank hardened product matched for the downside assistant machine of the internal batch mixer ,which is comprised of the gear units for the extruder and the sheeting machine. There are five types of driving of this main gear unit , and left and right driving kinds for each type.

The gear unit of extruder (type A) includes left and right sets of gear units (acylindrical gear unit and a bevel gear unit respectively) ,and one of the bevel gear unit is connected to motor through resilient coupling with its input shaft. Input shafts of the two bevel gear units are connected by flexible coupling. Both bevel gear units are reversed the rotation director by bevel gears, and reduced the speed by parallel gears, and finally the speed of two output shafts (hollow shaft) get the same by rotate on opposite directions and drive the meshing thread rod respectively.

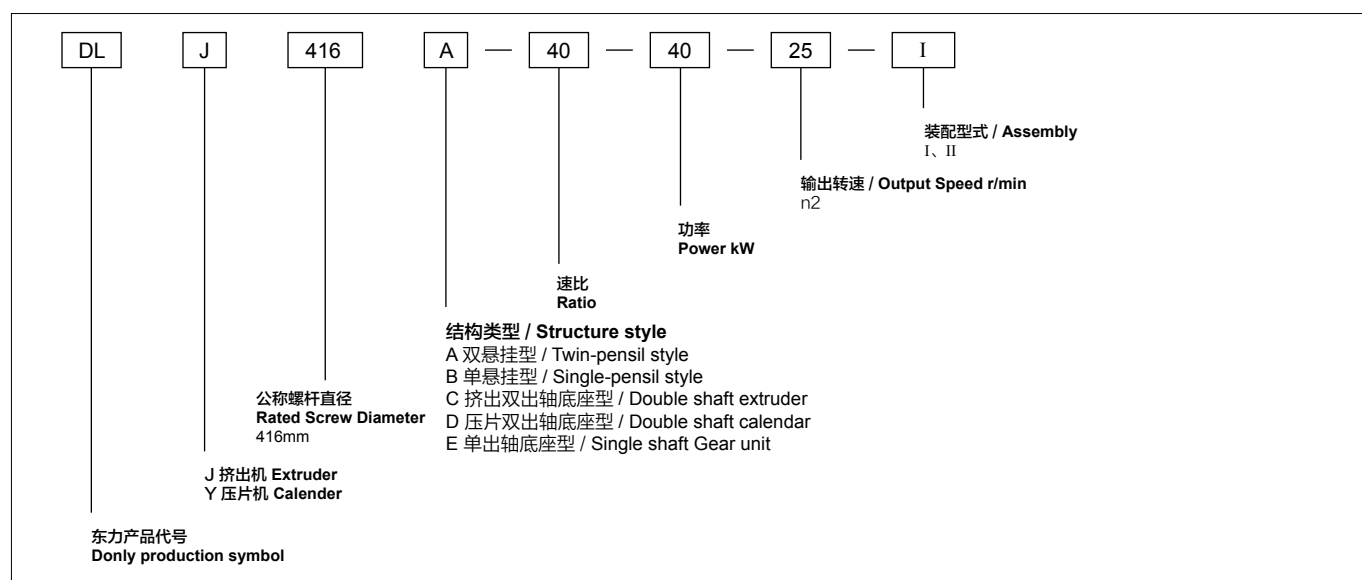
The gear unit of extruder (type B) is connected to the motor by resilient coupling ,and through three stages of gears reducing the speed ,the output shaft (hollow shaft)gets the output speed. As the rotor shaft of the extruderhas been assembled into the hollow shaft, the movement and power are transmitted to the rotor shaft through hollow shaft, after that, through a pair of bevel gear units ,it drives the meshing thread rod of the extruder.

The input shafts of gear units of extruder (type C) and sheeting machine (type D) are connected to motors through resilient couplings. Reduced by three stages of parallel gears, the rotation speed at the output shaft I is n_1 , and then the power is distributed by a gear between two output shafts which has the same teeth number, shaft II gets the same rotation speed with shaft I. These two output shafts are connected to rotor shafts of the working machine through flexible couplings, thus the two rotor shafts work under same rotation speed and opposite directions.

The input shaft of gear unit of sheeting machine (type E) is connected to the motor through resilient coupling. By three stages' reduction, the output shaft gets it speed, this speed is transmitted to the rotor shaft of the rotor sheeting machine through crowned teeth coupling.

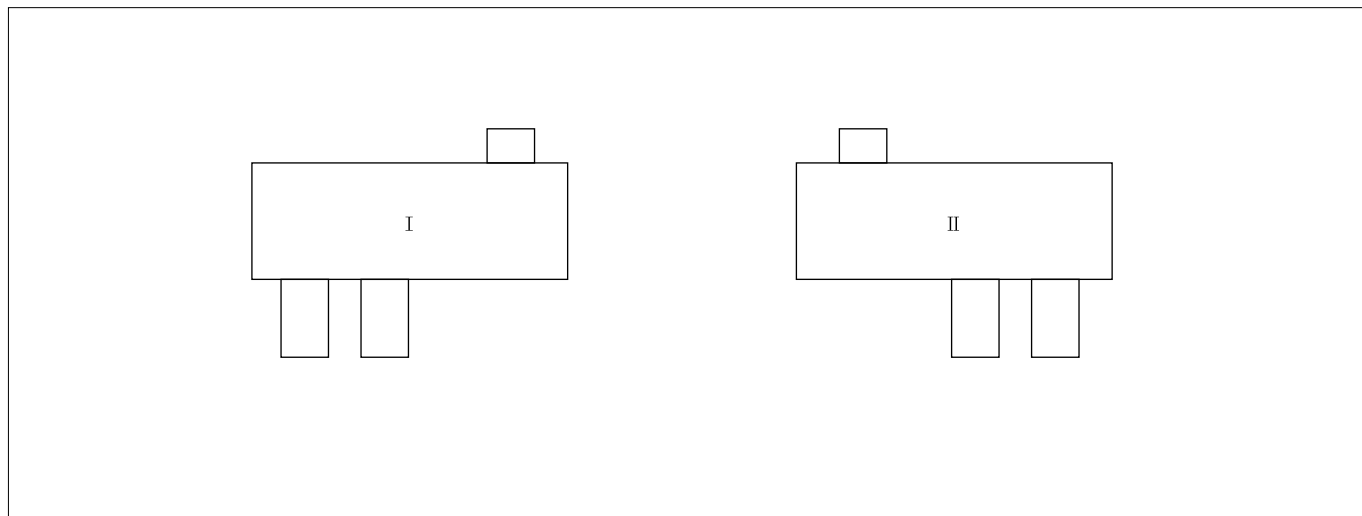
7.2 产品编号示例

7.2 Designation example



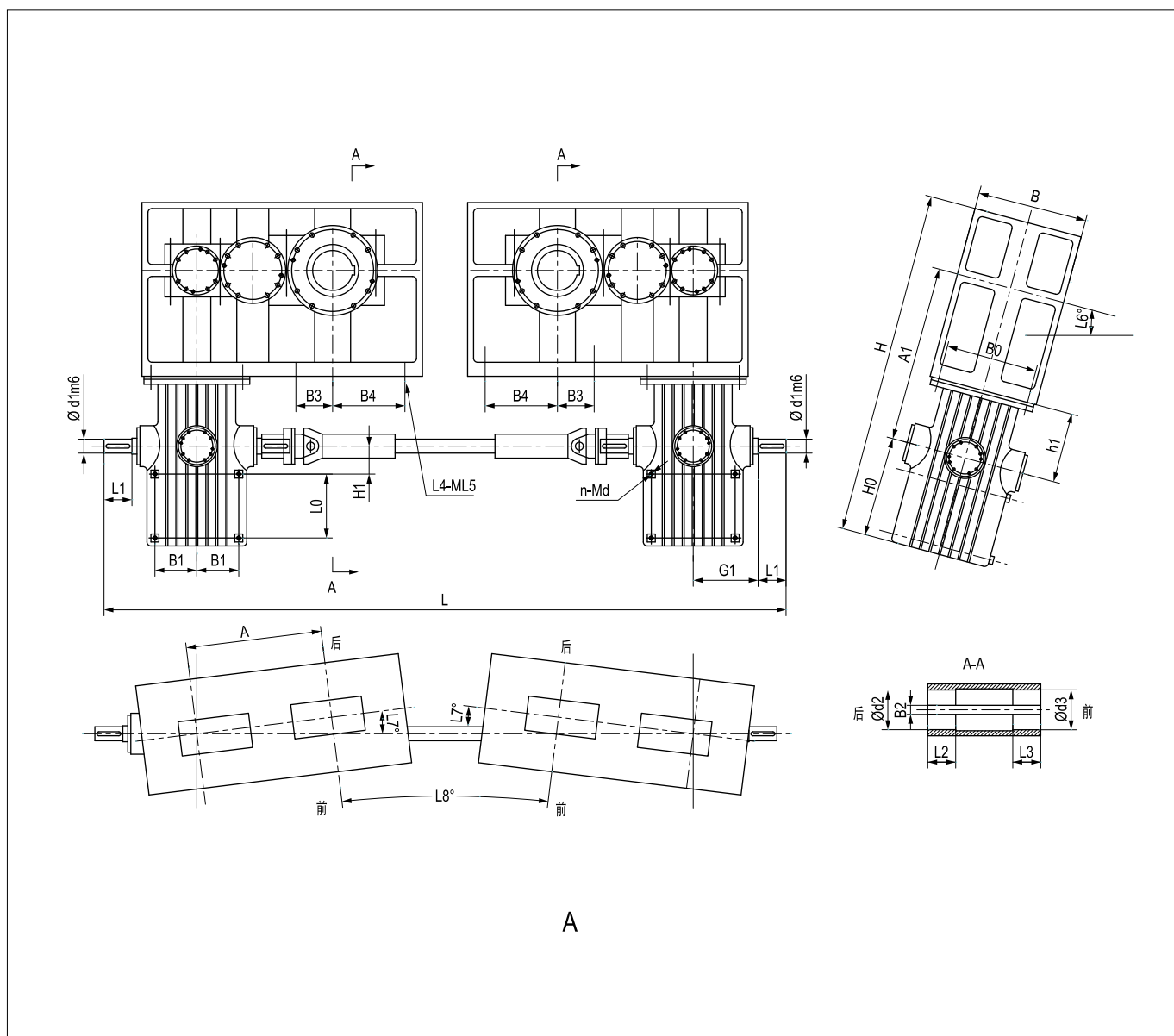
7.3 装配型式

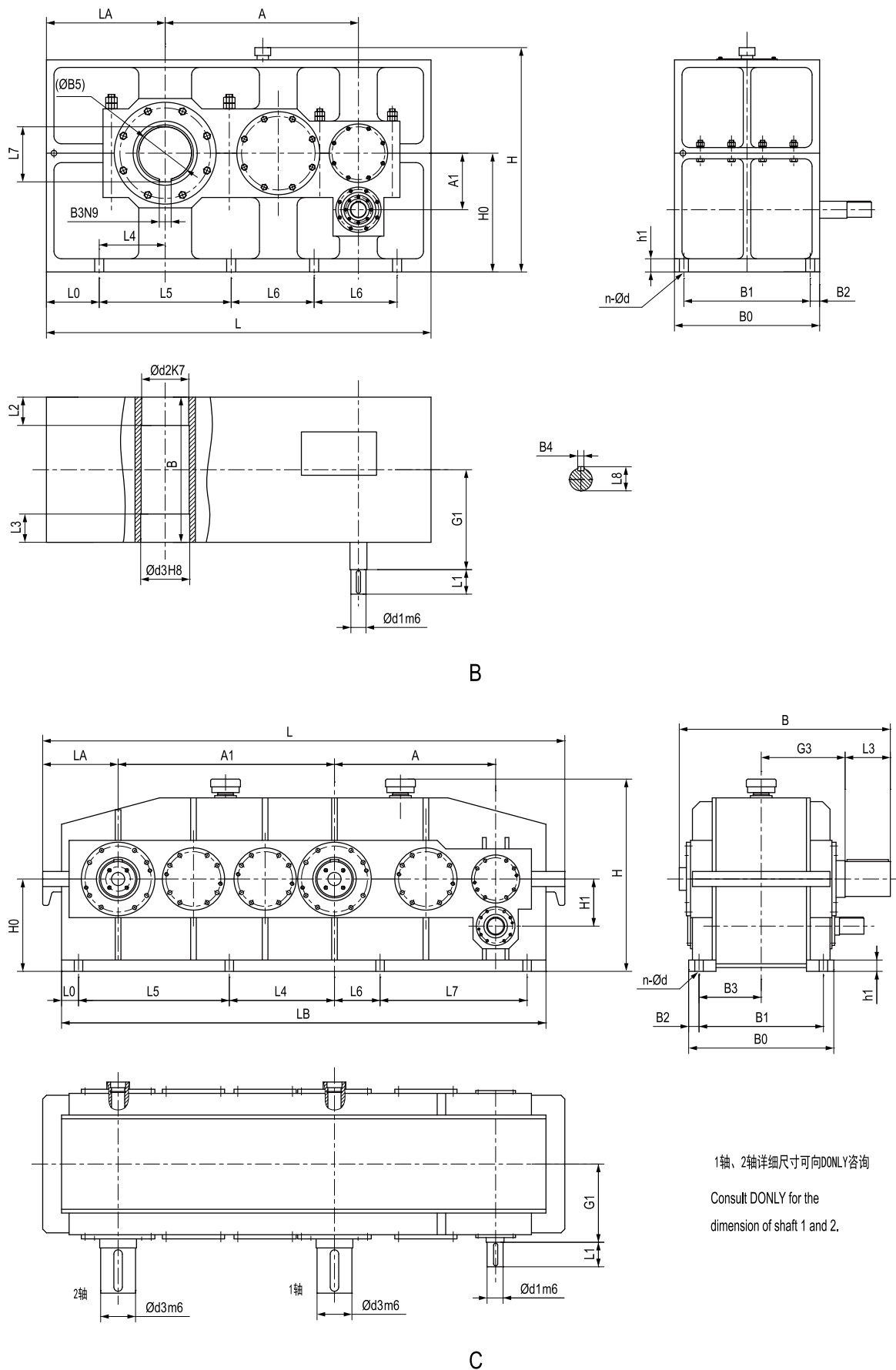
7.3 Assembly



7.4 外形尺寸

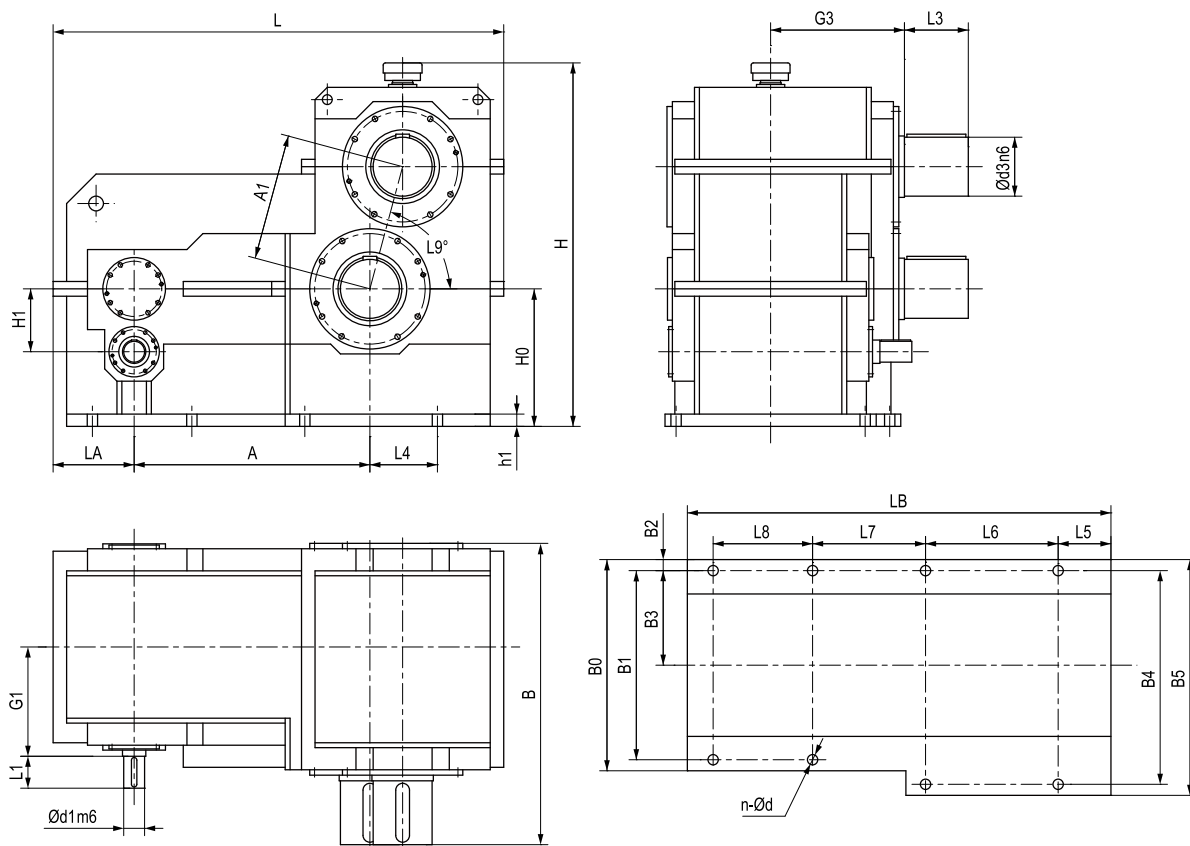
7.4 Outline dimensions



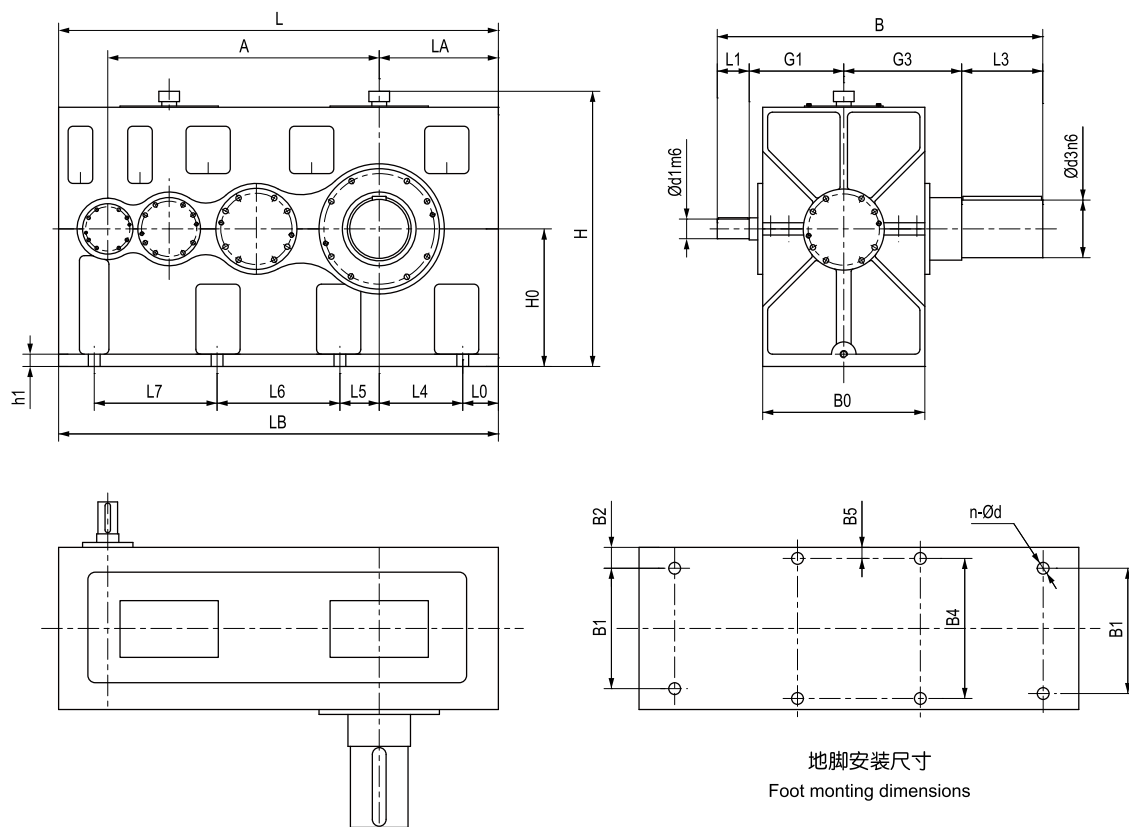


DLJY 挤出压片机齿轮箱

DLJY Gear Units For The Extruder & Calender



D



E

7.5 产品索引

型号 Type	产品编号 Designation	规格 Size
250	DLJ 250B-45-110-22-I/II	01
	DLY250E-40-110-25-I/II	02
300	DLJ 300A-45-132-22/22-I/II	03
	DLY 300E-40-132-25/25-I/II	04
330	DLJ 300B-49-160-23.5-I/II	05
	DLY 330D-40-160-28.75-I/II	06
416	DLJ 416A-45-180-22/22-I/II	07
	DLY 416E-40-180-25-I/II	08

7.5 Product index

型号 Type	产品编号 Designation	规格 Size
416	DLJ 416B-45-250-22-I/II	09
	DLY 416E-40-250-25-I/II	10
416	DLJ 416C-35.5-5-220-28-I/II	11
	DLY 416D-35.5-220-28-I/II	12
450	DLJ 450B-80-220-18.75-I/II	13
	DLY 450D-56-220-26.5-I/II	14
450	DLJ 450B-80-250-18.75-I/II	15
	DLY 450D-56-250-26.5-I/II	16

7.6 技术参数

规格 Size	型号 Type	传动功率 Power	输入转速 Input speed rpm	输出转速 Output speed rpm	速比 Ratio	油量 Oil volume L/min	重量 Weight kg
01	250	110	1000	22.2	45	16	1590
02		110	1000	25	40	—	1760
03	300	132	1000	22.2	45	16	3780
04		132	1000	25	40	—	2320
05	330	160	1150	23.5	49	16	3100
06		160	1150	28.7	40	16	3000
07	416	180	1000	22.2	45	16	5800
08		180	1000	25	40	—	3200
09	416	250	1000	25	40	25	3635
10		250	1000	25	40	—	4300
11	416	220	1000	28	35.7	40	5600
12		220	1000	28	35.7	25	4140
13	450	220	1500	18.75	80	16	3900
14		220	1500	26.5	56	16	4100
15	450	250	1500	18.75	80	16	5375
16		250	1500	26.87	55.8	16	5120

DLJY 挤出压片机齿轮箱

DLJY Gear Units For The Extruder & Calender

规格 Size	型号 Type	A	A1	B	B0	B1	B2	B3	B4	B5	n-d	d1	d2	d3	G1	G2	G3
01	250	785	-	536	460	352	54	45	18	198	2-35	60	200	199	275	-	-
02	250	785	-	961	480	352	64	-	410	35	8-35	60	-	170	275	-	291
03	300	605	700	536	410	110	45	175	325	-	4-M20	65	179	180	320	-	-
04	300	880	-	940	510	430	40	-	430	40	8-39	65	-	180	305	-	290
05	330	1094	-	720	600	500	50	56	20	237	8-40	75	236	240	355	-	-
06	330	765	415	996	740	650	45	270	650	740	8-38	75	-	220	365	-	475
07	416	680	880	566	460	210	45	184	362	-	4-M20	70	199	200	325	-	-
08	416	995	-	1090	580	430	75	-	504	38	8-42	70	-	220	340	-	345
09	416	1105	-	785	660	570	45	63	22	282	8-48	80	279	280	385	-	-
10	416	1105	-	1245	660	570	45	-	570	45	8-48	80	-	240	385	-	480
11	416	855	1148	1120	770	660	55	330	-	-	8-45	85	-	185	415	-	445
12	416	855	503	1050	740	650	45	325	650	740	8-42	85	-	185	420	-	420
13	450	1216	-	720	610	510	50	56	22	255	6-48	85	250	260	355	-	-
14	450	855	515	1060	740	650	45	325	650	740	8-42	85	-	240	420	-	420
15	450	1025	300	770	-	670	50	56	22	255	8-48	85	250	260	530	-	-
16	450	960	515	1105	860	770	45	385	770	860	8-42	85	-	240	445	-	445

规格 Size	H	H0	H1	h1	L	L0	L1	L2	L3	L4	L5	L6	L7	L8	L9	LA	LB
01	800	400	-	50	1351	1316	95	75	75	928	-	-	210.4	-	-	388	-
02	800	400	-	50	1351	35	95	-	220	353	176	376	376	-	-	388	1351
03	1510	450	200	300	3038	200	120	100	100	6	M36	15	7.5	15	-	-	-
04	906	450	-	60	1540	58	105	-	240	387	187	425	425	-	-	445	1540
05	1080	500	-	60	1800	200	105	220	220	300	550	450	248.9	-	-	500	-
06	1280	450	224	-	1540	-	105	-	240	266	145	500	380	320	-	314	1440
07	1720	500	140	350	3416	320	140	140	140	4	M36	15	7	14	-	-	-
08	1020	500	-	40	1740	53	125	-	280	452	225	478	478	-	-	505	1740
09	1120	560	-	50	1790	145	130	200	200	340	500	500	292.4	-	-	485	-
10	1120	560	-	50	1790	145	130	-	330	340	160	500	500	-	-	485	1790
11	1020	490	250	60	2770	90	130	-	240	558	800	242	780	-	-	400	2570
12	1320	500	250	50	1990	-	130	-	240	275	195	540	400	360	-	380	1600
13	1100	580	-	60	2050	170	130	150	150	390	780	475	267.4	90	475	590	-
14	1400	500	250	50	1760	-	130	-	260	275	195	540	400	360	75	330	1600
15	1190	630	-	70	2040	280	130	150	150	350	700	440	267.4	-	-	630	-
16	1380	560	256	-	1835	-	130	-	260	275	215	540	460	405	-	330	1725

8.1 使用环境

- 环境温度: $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- 环境湿度: 85% 以下
- 氛围环境: 没有腐蚀性气味、爆炸性气体和蒸汽等; 没有尘埃的、换气良好的场所。
- 如在上述以外的条件下使用时, 就是特殊要求使用, 请与制造商联系。
- 如果订货时指定室外并要防爆, 设计制作将按要求进行。在制造方明确指定的安装环境中使用则没有问题。
- 应安装在检查、保养等各种作业容易进行的场所。
- 应安装在刚性良好的台架上。

8.2 收到货物时的检查

1. 注意事项

- 外部进行确认后再打开包装箱。打开包装箱时要注意安全, 防止有异物掉落造成人员伤害事故。
- 检查收到的货物是否与订单一致。如果使用了与订单不一致的产品, 有可能造成人员受伤或设备损坏。
- 不要拆卸铭牌。

2. 检查要求

- 传动装置或齿轮箱到货, 应检查以下事项, 如果有问题或有疑问, 请与制造商联系。
- 铭牌上所写的项目内容以及装箱单中的供货范围是否与订单相同。
- 运输途中有无破损。
- 螺栓与螺母是否松动。
- 仪器仪表是否损坏, 油路是否松动。

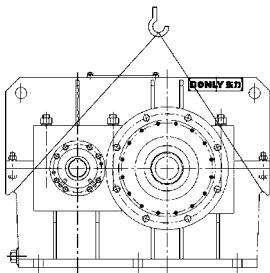


图1 起吊示意图
Drawing 1 Lifting sketch

8.3 起吊、运输和保管

1. 起吊

- 在起吊传动装置或齿轮箱货物时, 绝对注意不要进入起吊物 (货物) 的下方。有可能因货物掉下而引起人身事故。
- 起吊时注意起吊位置, 按照图 1 平稳起吊, 并注意轻吊轻放。
- 起吊时有落下或反转的危险, 要充分加以注意。有起吊螺栓、起吊孔等起吊装置的传动装置或齿轮箱, 必须使用起吊螺栓和起吊孔等起吊装置, 起吊整套传动装置或齿轮箱时, 必须使用下面部位或下箱体的起吊孔起吊, 不允许使用传动装置上部或上箱体起吊孔起吊。传动装置或齿轮箱安装到机器上以后, 不可使用起吊螺栓和起吊孔来起吊整个机器。否则, 会因落下、反转或起吊螺栓、起吊孔的破损而引起人员受伤或机器破损。
- 起吊前通过铭牌、包装箱、外形安装图和产品样本等确认一下传动装置或齿轮箱的重量, 超出起吊工具额定重量的传动装置或齿轮箱不能起吊。否则会因吊具的破损、落下或反转而引起人身伤害或设备破损。

8.1 Working condition

- Ambient temperature: $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- Ambient humidity: lower than 85%
- Environmental conditions: no corrosive gas, explosive gas or vapour. No dust and at better air exchange place.
- If have other special requirements besides the above ones, please contact us.
- If there are requirement for anti-explosion in open on the purchase order, our designers will consider it. It will be safe to install our products under our specification.
- The gear unit should be installed at this kind of place where it is convenient to carry out the inspection and maintenance work.
- The gear unit should be installed Oil rigid support

8.2 Inspection upon receipt of the gear unit

1. Notes:

- Please confirm whether the packing is still in good condition before opening. Please take care when opens the packing Prevent personnel injury due to unidentified object dropt.
- Check whether received goods are coordinate with goods listed in the purchasing order if improper products are used, it may cause injury or equipment broken.
- Do not remove the nameplate.

2. Inspection Requirements

- The following should be inspected when the driving device or the gear unit arrives. If there are some confusion or problems, please contact DONLY.
- Whether items on the nameplate or things on the packing list are the same as them in the purchasing order.
- Whether there are some damage caused by transportation.
- Whether bolts or nuts are loose.
- Whether the instruments are damaged and pipings are loose.

8.3 Lifting transportation & storage

1.Lifting

- When lifting the driving device or the gear unit, it's forbidden to stand below the gear unit, as the dropt gear unit may cause injury.
- Please note the lifting position shown in the drawing 1. Please lift the gear unit with care.
- Please be careful when lifting the gear unit since it may drop down or turn over. If there are lifting bolts or holes, one must use them when lifting .When lifting the whole set of gear unit, one must use lifting holes in the lower housing ,while it is forbidden to use them in the upper housing. However, after the gear unit is installed to the equipment, do not use lifting bolts or holes to lift the equipment as it may cause injury or machine broken.
- Please clarify the gear unit's weight before lifting from the nameplate, package, outline drawing or sample copy. If it exceeds the maximum lift capacity of the lifting device, please do not lift the gear unit as it may cause injury or machine broke.

使用说明

The Operation Manual

2. 运输

- 运输前应先排尽齿轮箱中的润滑油。
- 齿轮箱应进行可靠的固定。
- 采取防风、防雨、防潮措施。
- 禁止直接放置在地面上。

3. 保管

传动装置或齿轮箱短期内不使用时，应按以下注意事项进行保管

1) 保管场所

- 应保管在室内清洁、干燥的地方，不要保管在室外、有潮气、粉尘大、温度变化大、有腐蚀性气体的场所。
- 输入、输出轴轴伸部分必须涂防锈油。
- 分解后润滑油管要用乙烯树脂包起来，避免异物混入。
- 保管时应注意采取防风、防雨、防潮措施。
- 禁止直接放置在地面上。

2) 保管期限

- 保管期限应为下述防锈期间以内。
- 当保管期长于下述防锈期间时，需要特殊防锈规格，请与制造商联系。
- 如果是出口产品时需使用出口防锈规格，应与制造商联系。

标准防锈规格

① 外部防锈

产品出厂时，都已涂过防锈油，出厂后 6 个月应检查一次防锈状态，必要时再次采取防锈措施。

② 内部防锈

2. Transportation

- The lubrication oil must be drained out before transportation.
- The gear unit must be fastened tightly.
- Anti-wind, anti-rain and anti-moist protection must be adopted.
- It is forbidden to place the gear unit directly on the ground.

3. Storage

If the driving device or gear unit stops for a short period, it should be stored as follows:

1) Proper place for storing

- The gear unit should stay in a clean and dry place. Do not lay it out door or at this kind of place where may be humid, dusty and the temperature is changeful or contains corrosive gas.
- Rust preventative oil must be painted to the input and output shafts.
- After dismantlement the lubrication oil pipes should be packed with vinyl resin to prevent foreign substances from getting inside.
- Anti-wind, anti-rain and anti-moist protection must be adopted.
- It is forbidden to place the gear unit directly on the ground.

2) Storage period

- This period should not exceed the rust preventing period as follows.
- If the storage period will be longer than rust preventing period, and needs to do more for rust prevention, please contact us.
- If this gear unit will be utilized in an export product, and needs us to paint in accordance with the specification for export products, please contact us.

Standard rust prevention

① Outside rust prevention

The gear unit has been painted with rust preventative oil before delivery.

The anti-rust status must be inspected in 6 mouths after delivery, and if it is necessary, it should be painted again.

② Inside rust prevention

防锈期间 Rust prevention period	6 个月 6 Months
保管条件 Storing condition	没有潮气、没有粉尘、温度变化不大，没有腐蚀性气体等的环境，一般保管在工厂的室内或仓库内。 There should be no humidity, no dust, less temperature change, no corrosive gas. Normally it should be lie in doors or in the storage area.

3) 保管后的使用

- 油封受到温度和紫外线等的环境影响后容易老化、变质，所以经过长期保管后开始运行前一定要进行检查，如果认为有老化、变质时，应及时更换新品。
- 开始运行时要检查是否有异常声音、振动、发热等现象，带制动器时应确认制动器的动作是否正常。如果有异常时要立即与制造商联系。

3) Usage after storage

- Be effected by temperature, ultraviolet radiation and other factors, seals are easily aging and metamorphosing. Thus, before restart up the gear unit after a long time storage, therefore one should inspect seals, if the above mentioned happens, please change them into new ones.
- When restarting up the gear unit, please inspect whether there are abnormal noise ,vibration or heating. If a brake is attached, please check whether is works well. If there is any abnormal phenomenon, please contact manufacturer.

8.4 安装与找正

1. 安装前检查

- 产品的型号、规格是否正确；
- 零部件及附件是否齐全；
- 随机资料是否齐全；
- 运输及存放过程中有无损伤、锈蚀；

8.4 Installation & alignment

1. Inspection before installation

- To inspect whether the type or specification is correct;
- To inspect whether the parts or accessories are complete;
- To inspect whether the attached documents are complete;
- To inspect whether there are damage or corrosion caused by transportation or storage.

2. 安装时的注意事项

- 不要在有爆炸性氛围的环境中进行使用, 否则, 有可能引起爆炸、起火、触电、受伤、火灾或设备破损。如果确实需要在此环境下使用, 请使用防爆型电动机。
- 如果选用防爆型电动机时, 应使用适合危险场所 (存在气体或蒸汽爆发性氛围的场所) 使用的电动机型号。否则, 有发生爆炸、起火、触电、受伤、火灾的危险。
- 传动装置的周围绝对不能放置可燃物。否则, 有可能引起火灾。
- 传动装置和齿轮箱周围不要放置影响通风的障碍物, 否则会因冷却不畅、异常过热而引起损伤或火灾。
- 不要踩在传动装置或齿轮箱上, 不要悬吊, 否则, 可能造成人员受伤或设备破损。
- 检查传动装置或齿轮箱安装方式是否正确, 齿轮箱有三种安装方式: 上位机安装、中位机安装和下位机安装。

3. 地基

- 齿轮箱必须安装在刚性好、无振动、水平的地基上, 例: 齿轮箱可安装在支承面经过机械加工的基础框架上, 基础框架须与水泥基础浇灌成一体。经找正后的齿轮箱必须用锥销定位后, 再用螺栓把其它基础框架连接在一起。

4. 找正

- 齿轮箱与主电机找正、齿轮箱与螺杆机筒的找正必须符合图 1 的要求。良好的安装精度不仅可以提高设备的运行效率, 还可以延长齿轮箱的使用寿命。采用下图的找正方法可以排除由于输入、输出联轴器制造精度不高引起的误差累积。

1) 齿轮箱与主电机找正

- 齿轮箱与主电机相连接的输入轴在运转时必须与电机轴同心。为了满足这个需要, 其轴向与径向跳动必须用专用测量装置来测量, 具体如图 2 所示 (要求电机与齿轮箱输入轴同步转动):

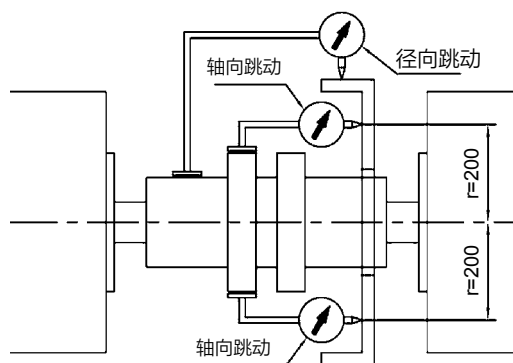


图 2 联轴器找正示意图
Drawing 2 sketch man for alignment

2. Notice during installing

- Do not running the gear unit in the place where there has explosive factors, or it may cause explosion, fire breakout, electric shock, injury, fire hazard to equipment broken. If it is really necessary to run the gear unit under this kind of condition, be sure to use an anti-explosion motor.
- When choosing an anti-explosion motor, be sure that it's a suitable type for using in dangerous places (where has the danger of gas or vapor eruption). Otherwise it may cause explosion, fire breakout, electric shock, injury, fire hazard or equipment broken.
- It is forbidden to stay any combustibles near the driving device, or it may arise fire hazard.
- Do not put any article that may effect the ventilation around the driving device and gear unit, as it may cause equipment broken or fire hazard because of less cooling or abnormal heat.
- It is forbidden to stand upon the driving device or gear unit. Do not hanging the gear unit, or it may cause injury or equipment broken.
- To inspect whether the installation position is correct. There are three installation position of the gear unit: upside, middle and downside position.

3. Groundwork

- The gear unit must be installed on rigid, no vibration and horizontal groundwork. E.g, the gear unit can be installed on a supporting surface being machined framework, however the framework must be poured to be one unit with concrete. The aligned gear unit must be oriented by taper pin, and then to connect other frameworks with bolts.

4. Alignment

- The fixing of the gear unit's input shaft and motor must accord with request of nether form. The fixing of the gear unit's output shaft and the rotors of the mixer must accord with request of nether form. The idiographic fixing method see drawing 1. Good of installing accuracy not only can advance circulating efficier but also prolong service life of equipments. Adopting drawing 1 methods can reduce cumulative error because of lower precision of input Coupling and output Coupling.

1) To align the gear unit with the motor

- When the shaft that connects gear unit and main motor rotates, it should be concentric with the shaft of motor. To catch up this requirement, the radial and axial run out should be measured with special measuring device. See the detail in the drawing 2 as follows (motor and input shaft of the gear unit must rotate synchronized).

联轴器类型 Coupling type	径向跳动 Radial run-out	轴向跳动 Axial run-out (r=200)
刚性联轴器 Rigid coupling	0.05	0.03
弹性联轴器 Flexible coupling	0.08	0.08
如需要 $r > 200\text{mm}$, 轴向跳动值可相应增大 If $r > 200\text{mm}$, the axial run-out can be bigger correspondingly		

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2) 齿轮箱与主机的安装与找正:

- 在与主机连接前, 先确认旋转方向。否则, 会因旋转方向错误而引起受伤或机器损坏。
- 安装齿轮箱时, 不要对轴施加冲击力或过大的负荷。否则, 有可能会引起轴承的损伤或油封的损坏。
- 齿轮箱与主机之间的安装工作必须正确而细致的进行。安装时必须检测输出轴与主机转子轴的同轴度, 径向跳动小于 0.15mm, 端面跳动小于 0.10mm。

5. 安装

建议按如下步骤进行安装:

- 在齿轮箱输入轴、输出轴端面上划出中垂线, 打样冲眼。
- 齿轮箱就位, 保证齿轮箱输入轴、输出轴端面中垂线与基础轴向中心线重合。
- 在齿轮箱基准面上用水平仪校正水平, 水平度允许误差为 $\pm 0.04\text{mm/m}$ 。找正可在箱体底面与基础面之间加垫块 (片) 或斜铁调整, 垫块在高度方向不得超过 3 块, 垫块配置要避免引起箱体变形, 应在地脚螺栓两侧对称排列。
- 校正水平后, 齿轮箱输入轴对电机轴, 输出轴对螺杆机筒应严格对中, 在轴线和径向两个方向的同轴度都必须满足上述要求。良好的轴向和径向对中, 可使设备保持优良的性能和长久的机械寿命, 齿轮箱和电机工作更加平稳, 噪声小, 功耗最小。
- 拧紧全部地脚螺栓, 在此过程中要保证齿轮箱不再移动。具体操作为将百分表固定在安装基础上, 表头测量附近的齿轮箱座表面, 拧紧地脚螺栓过程中观察百分表是否发生改变, 如发生改变, 说明基础不平或垫块没有垫好, 应重新校正。
- 输入联轴器必须要留有 6mm 左右轴向间隙。
- 安装冷却水、联轴器防护罩等其它设备。按要求接好冷却水管路, 保证水管在设备运行过程中不出现渗漏水。联轴器防护罩按有关标准现场安装。

6. 稀油润滑装置

- 稀油润滑装置由电机油泵、油过滤器、冷却器、仪表、管道、阀门等组成, 工作时润滑油经油过滤器、油泵、冷却器冷却后被送到齿轮箱的各润滑点, 通过调节安全阀可以确定油站的最高工作压力。工作压力出厂前调好, 使用时不必调整。稀油润滑装置压力一般在 0.1~0.4MPa, 冷却水压力为 0.2~0.3MPa, 冷却器进水温度 $\leq 28^\circ\text{C}$, 油流量和水流量的比例为 1:1.5。

稀油润滑装置建议按如下规程操作:

- 按系统工作压力及工作油温, 将压力控制器的动作压力调节到设定值的相应位置, 打开稀油润滑装置相应的油路和水路阀门。
- 在主齿轮箱工作前, 先开启油泵电机, 使系统达到一定工作压力稳定运行 15 分钟后, 再启动主齿轮箱主电机运行; 在主齿轮箱停止工作 10 分钟后, 再关停稀油润滑装置油泵。
- 稀油润滑装置工作时, 油压、流量出现异常情况时, 要根据相应的输出信号判断故障原因。故障原因不明时先切断主机电源, 待齿轮箱完全停止工作 10 分钟后再切断稀油润滑装置机电电源。

2) Installation and alignment of the single screw extruder to the gear unit:

- Confirm the rotation direction before connecting to the single screw extruder. Otherwise, it may cause injury or machine damage, as the rotation direction is not correct.
- Avoid bringing impact force of too much load to the shaft when installing the single screw extruder. Otherwise, it may cause broken of bearing or seal.
- Installation of the single screw extruder and gear unit must be carried out with care and correctly. Use core rod to inspect the coaxiality of the positioning inner hole on the low speed hollow shaft and the step hole of the thrust bearing. Radial runout should be less than 0.15mm while surface runout should not exceeds 0.10mm.

5. Installation

Please install as follows:

- To draw vertical lines on surfaces of input and output shafts of the gear unit and then punch holes in the surfaces along axes.
- Place the gear unit, and make sure that vertical lines on the input and output shafts are coincident with the axial centering line of the foundation.
- Using gradienter emendates leveling on level seats of gear unit, leveling error less than 0.04mm/m. Blocks or shims can be filled between bottom surface of the housing and foundation surface to help aligning. The blocks number should not exceed three in height. Blocks should be lined symmetrically on both sides of the foundation bolts to avoid deformation of the housing.
- After aligning, input shaft and motor shaft should be strictly centered, the same as hollow shaft and screw bush. The axiality of both axial and radial directions must meet the designing requirements. Better aligning will make smoother running of equipment, and the power consumption will be less.
- Be sure there is no movement of the gear unit during fastening all foundation bolts. A dial indicator should be used during this process. First to fix a dial indicator on the installing foundation, then to inspect whether the probe moves while fastening bolts, if it moves, that means the foundation is not plane enough or blocks are not proper, and alignment should be carried out for another time.
- There must be about 6mm clearance between input coupling's parts.
- Install the protective covers of lubrication station and coupling and other apparatuses. Connect pipes according to the demand on cooling water. Assure the pipe was leak during the device was operated. The protective cover of the coupling should be installed according to relevant standards in site.

6. The oil lubrication device

- This lubrication device consists of motor tri-screw pump (or gear pump), oil filter, safety valve, cooler, instruments, piping valves, etc. When working, lubrication oil pass through filter, pump and cooler, then arrive at several lubricating spot of the gear unit. Highest working pressure of the lubrication device can be confirmed by adjusting the security valve. And there's no need to adjust the pressure as it has been adjusted well before delivery. If readjust. the highest pressure, please inform the manufacturer. The pressure value of the oil lubrication device is generally 0.1~0.4MPa. The pressure value of the cooling water is 0.2~0.3MPa. The inlet water temperature is under 28 in the cooler. The value between the oil and the water is on a scale of 1:1.5.

Please operate the lubrication device as follows:

- Adjust the operating pressure of the pressure controller to setting value position according to the working pressure and working oil temperature. Then open the related oil piping and water piping valves of the oil station.
- Before the main gear unit beginning to work turn on the oil pump first, and after operating 15 min. For stabilizing the working pressure, then start up the main gear unit. Turn off the oil pump of lubrication device 10 minutes after the main gear unit stops
- When the oil pressure or flow of the lubrication device is abnormal, please judge blooey reasons from relevant outputting signals. Stopping electrical source of the main motor when the malfunction is uncertainty, the electrical source of lubrication oil unite can be closed when the gear unit stop working after 10 minters.

- 油过滤器每三个月清洗一次，如进出口压差超过 0.05Mpa 时应立即清洗或更换。初期使用时，应经常清洗。
- 螺杆泵轴密封圈要经常检查，如有泄漏现象或损坏，应及时更换。
- 冷却器必须根据水质情况，5 至 10 个月进行一次内部检查与清洗。

8.5 现场安装，调试与试车记录

现场安装、调试时应作如下记录：

1. 齿轮箱的型号
2. 齿轮箱出厂编号
3. 单螺杆挤出机规格型号
4. 主驱动电机的规格、型号、功率、转速、电压、电流
5. 驱动方向（由主电机端看）
6. 安装找正过程中应做的详细记录：
 - 齿轮箱与电动机的找正结果记录：
轴向 径向
 - 齿轮箱与螺杆机筒的找正结果记录：
轴向 径向
7. 磨合运转试验纪录
开始运转时间 年 月 日
停止运转时间 年 月 日
挤出机负荷： 运转时间数：

- The oil filter should be cleaned every 3 months. When the oil pressure on the oil inlet exceeds 0.05Mpa than it on the oil outlet, the filter must be cleaned or changed soon. At the very beginning, the filter should be cleaned frequently.
- Check the seal ring on the shaft of tri-screw, pump frequently and it should be changed soon when leakage or damage appears.
- Inside inspection and cleaning of the cooler must be carried out every 5-10 months according to water quality.

8.5 Records of locale installation, commissioning and test run

The following records shall be kept for field installation and debugging:

1. Type of the gear unit:
2. Product serial number of the gear unit:
3. Model and specs of the single screw extruder:
4. Size, model, power, rotation speed, voltage and current of the main driving motor:
5. Driving direction (from the main motor side):
6. Detailed records should be kept for installation and aligning:
 - Alignment result between the gear unit and the motor:
axial radial
 - Alignment result between the gear unit and the screw seat:
axial radial
7. Running-in test record
Starting time: year month day
Ending time: year month day
Load of the extruder:
Running time:

序号 No.	开车时间 年月日 Starting time year month day	停车时间 年月日 ending time year month day	主机负荷 Load of the main machine (T)	电机定子 电压 Voltage of motor stator (V)	电机定子转动电流 Starting current of motor stator (A)		电机定子 工作电流 Operating current of motor stator (A)	温度 Temperature(°C)			备注 Remark
					最高 Max	最低 Min		室温 Ambient temperature	箱体内部油温 Oil temperature inside the housing		
									试验前 Before test	试验后 After test	

8.6 齿轮箱的运行与维护

1. 启动

1) 启动前的注意事项及准备工作

- 齿轮箱出厂前已将润滑油排出，所以，运行前必须加入推荐的润滑油，并按齿轮箱油位计中刻线上线位置加注润滑油；
- 外接润滑油管路安装完毕，安装时应特别注意不能将棉纱、铁屑等留在管内，管道必须清洗干净；
- 检查安全控制和自动保护系统工作可靠；
- 检查油箱的油位是否正常，否则应调节至正常油位；
- 检查各仪器仪表、控制装置、开关等是否安装完毕，安装是否牢固可靠，能否正常工作，电器元件引出线绝缘情况是否良好；

8.6 Operation and maintenance of the gear unit

1. Start-up

1) Notes and preparation before start-up.

- Lubrication oil has been discharged from the gear unit before delivery, so recommended lube must be filled in before operation. Lubricating oil is imitted gear unit according to oil gauge of gear unit.
- Assemble the external lubrication piping completely. The pipes should be clean and free of any cotton or chips inside before fitting.
- Make sure by inspection that the safety controlling and automatic protection systems function reliably.
- Check oil level in the tank. If oil is less than required, refill to normal level
- Check whether all instruments & gauges, controlling apparatus and switches have been installed completely; whether these devices have been assembled firmly and can realize normal functions. Check insulation of outlet lines of electric components.

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- 检查各螺栓螺母等紧固件是否紧固;
- 检查输出轴的转向是否正确;
- 检查联轴器护罩及其他防护装置是否装好;
- 检查润滑油的牌号及粘度是否符合工作要求, 油面高度是否符合要求;
- 先手动盘车, 无异常声音及阻滞现象后启动稀油装置电机, 齿轮箱串油 10 分钟, 检查油泵旋转方向是否正确, 检查管路有无渗漏油现象;
- 通过箱盖观察窗口观察齿轮、轴承供油是否正常, 回油是否通畅, 如有油管堵塞或喷油位置不对, 应及时清洗管路或调整喷油角度, 齿轮箱出厂前所有管路已经调整好, 一般不需要再作调整。

2) 操作程序

- 齿轮箱稀油润滑站采用电机螺杆油泵, 由单独电机带动。在油泵运转后, 进口口油压控制在 0.1~0.4 MPa 时, 才能接通主电机电气开关。使用电气安全装置 (电气顺序开关) 保证有一个正确的开关顺序。在齿轮处于静止状态后油泵电机才能关闭。

3) 启动步骤

- 本齿轮箱出厂前已进行过空载试车, 但建议按以下步骤进行操作。
- 在任何情况下, 齿轮箱应在空负荷状态下启动。严禁在加载状态下启动电机。
- 齿轮箱内油温在 10℃ 以上时, 启动油泵电机, 当油温低于 10℃ 时, 先启动加热装置, 给冷却器内通蒸汽或热水, 油温超过 25℃ 后切断加热装置电源, 并启动润滑装置电机。
- 当进油温度 $\geq 42^\circ\text{C}$ 时, 启动冷却装置, 给冷却器通冷却水冷却。
- 润滑稀油装置先工作 10~15 分钟, 当油温、油压稳定后方可启动主电机。
- 先让挤出机空负荷运行 1 小时, 转速由低到高, 升到额定转速 15 分钟后, 再按 20%、50%、80%, 载荷分别运行 2、4、6 小时后, 再满负荷运行。

4) 注意事项和要求

- 试车过程中, 应密切注意齿轮箱响声有无异常、振动是否过大、轴承温升是否异常等, 出现上述异常情况时应立即停机并检查原因。故障排除后方可再次启动, 原因不明时请与制造商联系
- 带负荷情况下, 轴承温升最高不超过 40℃, 最高温度不超过 80℃, 润滑油温升不超过 35℃, 否则, 应立即停机。

2. 停车

停车前应注意事项和停车步骤

- 齿轮箱停止工作之前, 必须将挤出机负荷卸掉; 严禁带载停车。
- 1) 挤出机卸载
- 2) 主电机停机
- 3) 润滑装置停机
- a 当齿轮箱停止转动后, 润滑油泵再工作 10 分钟后停车;
- b 如果齿轮箱作短时间停机, 润滑油泵可以不关闭, 保证齿轮箱再次随时启动。

- Check fastness of all fastenings including bolts and nuts.
- Check the rotating direction of the output shaft.
- Confirm that protecting shields of couplings and other protective devices have been assembled correctly.
- Check grade and viscosity of the lube oil in accordance with operation requirements Check the oil level.
- First turn the machine by hand and if no abnormal noise or excess resistance is detected ,start up the motor of the oil lubricating device Keep lube oil flowing through the gear unit for 10 minutes, Verify rotating direction of the oil pump and check for oil leakage in the oil piping.
- Check the oil supply and oil return of gears and bearings through observation hole in the housing cover. If there is any oil pipe blocked or any oil nozzle misoriented such pipes should be cleaned, rinsed and nozzles adjusted timely. Normally all piping adjustment has been finished before the gear unit is delivered and no more adjustment is to be executed by the customer.

2) Operation procedure

- Tri-screw oil pump is used for gear unit lube station which has separate driving motor. Only after the oil pump has started up and the pressure at oil inlet is controlled between 0.1~0.4Mpa, can the main electric switch of main motor be turned on. Electric safety device (electric seriation switch) is used to ensure a correct on-off sequence. The motor of oil pump can only be turned off after the gears stop movement

3) Start-up steps

- The gear unit has gone through unloaded test run before delivery, but the following stops are still suggested.
- Under any circumstances, the gear unit must start up without any load. Loaded start-up is strictly forbidden for main motor,
- The oil pump can be started up when the oil temperature inside the gear unit is over 10℃ Steam or hot water is led through cooler when oil temperature is lower than 10℃ and will be cut off when oil exceeds 25℃.
- When the temperature of input oil $\geq 42^\circ\text{C}$, cooling device is put into function.
- First run the lubrication station for 10~15 minutes, and the main motor can be started up only after the oil temperature and pressure stabilize.
- First, keep the single screw extruder run for 1 hour without any load, increases the rotation speed gradually until the nominal speed is reached; Then run the single screw extruder for 2, 4, 6 hours at 20%, 50%, 80% of full load respectively; In the end, run under full load.

4) Notes and requirements

- During the commissioning, close attention should be paid to abnormal noise, excess vibration and quick rise of bearing temperatures. If any of the above cases is detected the equipment should be stopped immediately for inspection. The gear unit can be runned after malfunction is debared, if don't find malfunction reason, please contact with manufacturer.
- For loaded operation ,temperature rise at bearings should not exceed 40℃, the highest temperature not over 80℃, temperature rise of lubrication oil not over 35℃. If these temperature limits are exceeded, the temperature should be switched off immediately.

2. Stop

Notes and Steps of shutting down.

- The single screw extruder should be unload before the gear unit is shut down; Shutting down with load is strictly prohibited.
- 1) Unload the single screw extruder.
- 2) Shut down the main motor.
- 3) Stop the lubricating device.
- a. The lubrication oil pump can only be shut down 10 minutes after the gear unit stops movement.
- b. If the gear unit is only turned off for a short time, the oil pump can be kept running during this period so that the gear unit can be started up at any time.

4) 停止向润滑冷却器供水

- 冬季冷却水容易结冰，冷却水不应完全关闭，保持流动状态，或把水全部放空。
- 润滑装置停止工作后，如果需要再次启动齿轮箱，必须先重新启动润滑装置油泵，否则，不允许启动齿轮箱，该顺序应该由电气控制实现。

3. 维护

1) 检查与维护项目

- 首次运行 48 小时后，所有管件及紧固件做一次检查，看是否松动，并重新检查轴线对中情况，以后定期检查。
- 首次启动一周后，对过滤器的滤芯进行清洗，以后每月定期清洗一次。齿轮箱上的通气罩半年清洗一次。
- 每日记录齿轮箱工作负荷、转速、进油回油温度、轴承温度情况，如有异常变化应马上停机，分析原因，问题解决后再重新开机。

推荐做下列常规例行检查：

- 每日：检查是否漏油，有否异常振动、噪声、进回油温度以及轴承温度；
- 每周：检查油过滤器是否清洁，是否堵塞；
- 每月：检查螺栓是否松动，观察油位高度，发现不足及时补充，检查各仪表工作情况；
- 每六个月：对油质进行化验分析。如油质合格，建议将油从齿轮箱中排出，进行沉淀过滤后，重新使用。如油质已变坏，建议将油排出，并对油路系统进行清洗，注入新油。
- 检查冷却水管是否有水垢或其他沉淀物，管路是否锈蚀。
- 检查联轴器的对中及磨损情况。
- 检查齿面接触情况及轴承情况。
- 较长时间停车不用时，每周应使齿轮箱运转 10 分钟。否则，应按长期储存方式防锈包装，具体详见第四节齿轮箱的保管。

2) 润滑油

- 齿轮箱使用润滑油的牌号为：HSP220 或 HSP320(根据齿轮箱使用地的年平均温度选定)
- (ISO VG220 或 VG320 高级极压工业齿轮油)。
- 齿轮箱首次运行 6 个月即应换油，并对过滤器及齿轮箱进行冲洗。以后润滑油每年更换一次，最长不超过 15 个月，建议换油后对齿轮箱、油路及过滤器进行清洗。加油时应使用过滤器或滤网。
- 每运行 6 个月，对油质进行如下检查一次。如发现以下之一情况则需换油：
 - ◇ 观察箱体底部有无沉淀物。
 - ◇ 观察有无水或乳状物。
 - ◇ 检查粘度与原来相比，如差值超过 20%，说明油已失效。
 - ◇ 检查不溶解物，如超过 0.2%，则应换油或过滤。
 - ◇ 抗乳化能力检验，用以发现油品是否变质。
- 开始运行时，注意观察进油压力是否明显下降。如果进油压力明显下降，清洗过滤器，过滤润滑油。
- 现场使用情况表明，若采用符合标准规定的润滑油，并在油中加入 3%~5% 的倍力抗磨节能剂，可以降低齿轮箱的噪声（大约 2~4dB）和振动，提高整机效率，并且可以较长时间不须更换润滑油。油品质量检查同上。

4) Stop water supply to the cooling device of lubrication oil.

- In winter time, water can easily freeze so the water supply should not be shut off completely to keep the cooling water running, otherwise the water inside should be discharged entirely.
- If an oil pump in the lubricating device is already stopped, it has to be restarted before the gear unit resumes operation. Otherwise it is not allowed to restart the gear unit. The above-mentioned on-off sequence is realized by means of electric control.

3. Maintenance

1) Items of inspection and maintenance

- 48 hours after the first start-up, all piping and fastening pieces should be checked for loosening; alignment of axes should also be inspected. Such check and inspection should be repeated regularly.
- Clean the filter elements inside filters one week after the first start-up. Clean them every month in future operation. Clean the vent covers on the gear unit every 6 months.
- Keep daily records for operation load, rotation speed, inlet & outlet oil temperatures and bearing temperatures of the gear unit, in case of abnormal data, the gear unit should be stopped immediately and timely analysis should be made to detect reasons. Restart the gear unit after malfunction is solved.

Regular inspections are recommended as follow:

- Every day: Check for oil leakage, abnormal vibration, noise, inlet, outlet oil temperatures and bearing temperatures;
 - Every week: Check whether the oil filters are clean and unblocked;
 - Every month: Check whether the ground bolts loosen, verify the oil level and refill oil when it is too low, inspect the working conditions of all instruments and gauges;
 - Every six months: Chemical analysis for oil quality. If the oil is still up to the standard, it is suggested to discharge it from the gear unit for depositing and filtering before being reused. If the oil has deteriorated, it is suggested to discharge the oil, clean the piping system and fill in new oil.
- Check for incrustation, other deposits and rustiness inside the cooling piping.
- Check the alignment and wearout of the couplings.
 - Check flank contact of gears and the situation at bearings.
 - If the equipment is out of operation for a long period, the gear unit should be run for 10 minutes per week otherwise the gear unit should be packed against rustiness in accordance with long-term storage method. See the detail in the storage of IV.

2) Lubrication oil

- The lubrication oil for the gear unit: HSP220 or HSP320
- (ISO VG220 or VG320 high grade extreme pressure industrial gear oil)
- 6 months after the first operation oil inside the gear unit should be replaced and filters and gear unit should be rinsed. After that the lubrication oil should be replaced every 12 months, at most 15 months, It's suggested to clean the gear unit, the oil piping and filters after changing oil. Filters or filter screens should be used when fill in oil
- After every 6 months' operation inspect the oil and replace it if any of the following cases is detected:
 - ◇ Deposit at the bottom of housing
 - ◇ Water or lacteous substance inside
 - ◇ Check the viscosity, if there is a difference of more than 20% from the original value, then the oil is of no use any more.
 - ◇ When inspection shows insolubles exceed 0.2%, the oil should be changed or filtered.
 - ◇ Check the emulsion resistance of the oil to determine whether it has deteriorated.
- When start the operation, please pay attention to the inlet oil pressure. If the pressure drops obviously, clean the filter and filtrate the lubrication oil.
- Experiences accumulated in field operation indicates that if certified lubrication oil is used with Power up wear resister for energy saving noise (about 2-4dB) and vibration of the gear unit can be lowered and efficiency of the whole equipment improved. Besides, the lubrication oil can be replaced with a bigger time interval. Quality inspection for oil should be the same as above.

8.7 齿轮箱拆卸与装配注意事项

在工作一定时间后，对齿轮箱进行全面的检查及维修是不可避免的。在齿轮箱进行维修检查及更新安装时，通知制造商，以便取得适时的帮助。

1. 拆卸时的注意事项和要求

- 1) 必须拆卸检查时应在专门的场地进行，齿轮箱周围场地必须清理干净，没有其他杂物，并准备好木块或垫板放置零件以免损伤零件表面。
- 2) 拆卸前轴承测温用的热电阻应先拆下收好，以免碰坏。
- 3) 拆卸时应把外部油管管路拆下，拆下的管子须用乙烯树脂包扎以防油污渗入油管。
- 4) 起吊齿轮与轴时，注意内部油管，有影响时先拆卸油管。
- 5) 拆装任何零部件时，注意装配记号和定位销位置，重新装配时应按装配记号顺序恢复原来位置。
- 6) 拆箱后，防止任何杂物落入箱体内，重新装配时要清洗箱体，保持箱体清洁。
- 7) 在装卸轴承时，必须用液压装卸工具，如无此工具应与制造商取得联系。

2. 检查

齿轮传动零件解体后，零部件应做全面检查并作详细记录：

- 齿面接触与磨损情况；
- 轴承磨损情况；
- 检查后确定易损件更换清单。

3. 装配

- 齿轮箱重新装配时的要求应符合齿轮箱装配的各项要求，并按装配技术条件执行，如需帮助时可向制造商咨询；
- 重新装配时，所有零部件必须清洗干净，仔细检查零件有无损坏，必要时更换；
- 注意原来的装配记号；
- 螺栓螺母及其他联接元件，如果在拆装时损坏必须更换，弹簧垫圈必须更换；
- 箱体中分面及端盖安装时，结合面必须清洗干净，重新涂密封胶，以免渗漏油；
- 装配后，手动盘车无异常、无卡阻现象后再投入运行；
- 按上述建议的安装与启动步骤运行；
- 装配联轴器时不允许用锤子敲打，应把联轴器适当加热后烘套上去（加热温度应 $\leq 100^{\circ}\text{C}$ ），同时采取措施冷却联轴器与油封之间的轴颈，以防止油封高温老化。
- 在较大的维修中应重新更换润滑油，并对齿轮箱的找正进行重新复查。

8.7 Notes for disassembly and reassembly of the gear unit

- After some time of operation, it is necessary to carry out thorough inspection and maintenance for the gear unit. If you want to carry out maintenance, inspection and/or updating installation, please inform DONLY for timely help.

1. Notes and requirements for disassembly

- 1) When the disassembly is necessary, it should be carried out in dedicated field with clean surroundings and without unnecessary articles. Get ready wood blocks or plates for supporting the parts to avoid damaging part surfaces.
- 2) Before disassembly, first dismantle all external instruments and gauges to avoid damage.
- 3) During disassembly external oil piping should be removed, and the dismantled pipes should be packed with plastic film at both ends to avoid contamination.
- 4) Pay attention to internal oil pipes when lifting up gears and shafts, dismantle the pipes if there is interference.
- 5) Pay attention to assembly marks and positioning pins when disassemble parts. Keep the original positioning in reassembly.
- 6) Prevent any foreign body from falling into the box and keep cleanliness inside.
- 7) Hydraulic tools should be used for disassembling bearing. If no such tools are available, please contact DONLY.

2. Inspection

After been dismantled the transmission parts of gears should be inspected and recorded in detail.

- Flank contact wearout of gears.
- Wearout of bearing.
- After the inspection list out wearable parts to be replaced about the specification of damageable parts.

3. Assembly

- Reassembly of the gear unit should be according to all requirements in the assembly drawing and the technical conditions, or please inform the DONLY.
- All parts should be cleaned completely for reassembly amages, and place them when necessary.
- Pay attention to the original assembly marks.
- If connecting and fastening parts including bolts and nuts are damaged during dismantlement, the damaged parts should be replaced; besides, all spring washers must be replaced.
- When fitting the connecting surfaces and covers of the housings, clean up the connecting surfaces and reseal with sealing glues to prevent oil leakage.
- After reassembly, turn the equipment by hand. The operation can only be resumed if there is no abnormal movement and excess resistance.
- Follow the above suggested steps for assembly and start-up.
- Hammer striking is not allowed during assembly of couplings. The coupling should be heated (heating temperature $\leq 100^{\circ}\text{C}$) before assembly. At the same time, the shaft Journal between the coupling and oil seal should be cooled to prevent aging.
- For major maintenance lubrication oil should be replaced and the alignment of gear unit should be reinspected.

8.8 易损件

齿轮箱的易损件主要包括油封和轴承。它们是齿轮箱运行过程中必不可少却又最容易损坏的部件，通常情况下使用者要有一定的备品备件，以防不时之需。

1. 油封

- 油封的材料通常为丁腈橡胶（NBR）和氟橡胶（FPM），在实际使用时要特别注意，使用和处理不当可能会造成人员伤害。
丁腈橡胶（NBR）属于丙烯腈丁二烯橡胶，是具有很好的工程特性和“通用的”密封材料，是由丙烯腈和丁二烯合成的橡胶，对以下介质有良好的耐受能力：
 - 大部分矿物油和矿物油润滑脂；
 - 一般的燃料，如汽油、柴油和轻质的民用燃油；
 - 动物油、植物油和脂肪；
 - 热水。
- 丁腈橡胶（NBR）密封唇能允许短时间在无油的情况下运行。工作温度范围在 -50 至 100℃ 之间：短时间可承受的最高温度为 + 120℃。但不宜在更高的温度运行。因为温度过高会造成丁腈橡胶硬化，温度越高老化的速度也越快。
- 氟橡胶（FPM）最主要的特性是耐高温和耐化学腐蚀，并有很好的抗老化和抗臭氧的性能，而且透气度也非常低，即使在非常恶劣的工作条件下，仍然有非常好的耐磨特性。氟橡胶能承受 + 200℃ 或以下的工作温度，也能允许短时间在无油的情况下运作。
- 有些物质可能使其它材料制成的密封圈失效，但氟橡胶仍有很高的抵抗能力，包括油和液压油、燃油、润滑剂、无机酸、脂族烃和芳族烃等。在有脂、醚、酮、某些胺和高温的无水氟化氢等化合物的情况下，不应使用氟橡胶。
- 在温度超过 300℃ 以上时，氟橡胶会释放出有害的气体。所以处理用氟橡胶制成的密封圈时有潜在的安全问题，因此必须详细阅读以下的安全注意事项。

警告！

- 关于氟橡胶的安全注意事项
- 在正常工作条件和工作温度在 + 200℃ 以下，氟橡胶是非常稳定和无害的。但遇到 300℃ 以上的高温，如气割枪的火焰，氟橡胶密封圈会释放出有害的气体。吸入这些气体或进入眼睛会对人体健康造成损害。此外，氟橡胶密封圈一旦被加热到 + 300℃ 以上的高温，即使在冷却之后的处理也会有危险，因此绝对不可以与皮肤有任何接触。如果必须处理曾经受过高温的氟橡胶密封圈，应遵守以下安全注意事项：
 - 在整个过程中要佩戴护目镜、防护手套和合适的呼吸器具
 - 在剩余的密封圈放在一个密封的塑料容器中，并在上面加上标记“腐蚀材料”
 - 严格遵照材料安全说明书中的安全注意事项
 - 如果不慎接触到曾经受过高温的氟橡胶密封圈，应用肥皂和大量清水洗手或以大量水清洗眼睛，并立即就医。如果吸入氟橡胶释放出的有害气体，必须立即看医生。在使用期间，用户要负责正确的使用和妥善处理产品。对于因氟橡胶密封圈使用或处理不当造成的伤害，DONLY 概不负责。

8.8 Consumable parts

- The damageable parts of the gear unit include oil seal and rolling bearing. They are absolutely necessarily, but they are furthest damageable parts during the process of the gear unit's running. The consumer should deposit some spare part in order to need when these parts are abrupt shattered.

1. Oil Seal

- The material of oil seal usually is nitrile rubber and fluoro rubber. That oil seal is improperly used and disposed will hurt personnel. So handlers must especially notice Acrylonitrile butadiene rubber, NBR.
The term nitrile rubber is used in this catalogue for acrylonitrile-butadiene rubber. This material has very good engineering properties and is the "universal" seal material. It is a copolymer produced from acrylonitrile and butadiene. It shows good resistance to the following media.
 - Most mineral oils and greases with a mineral oil base.
 - Normal fuels: petrol, diesel and light heating oil.
 - Animal and vegetable oils and fats.
 - Hot water.
- It also tolerates short-term dry running of the sealing lip. The permissible operating temperature range is -50 to +100℃; for brief periods temperatures of up to +120℃ can be tolerated. At higher temperatures the material hardens.
- Fluoro rubber, FPM
- Fluoro rubbers (FPM) are characterized by their high thermal and chemical resistance. Their resistance to ageing and ozone is also very good and their gas permeability is very slight.
- Fluoro rubber seals have exceptionally good properties even under harsh environmental conditions and can withstand operating temperatures of up to +200℃. The seals are also resistant to oils and hydraulic fluids, fuels and lubricants, mineral acids and aliphatic as well as aromatic hydrocarbons which would cause seals made of other materials to fail. They will also tolerate dry running of the lip for short periods. The seals should not be used in the presence of esters, ethers, ketones, certain amines and hot anhydrous hydrofluorides.
- Seals made of fluoro rubber exposed to extreme temperatures above 300℃ give off hazardous fumes. Therefore the safety recommendations must be followed, see "WARNING! Safety precautions for fluoro rubber".

Warning!

- Safety precautions for fluoro rubber
- Fluoro rubber is very stable and harmless under normal operating conditions, up to +200℃. However, if exposed to extreme temperatures above 300℃, e.g. fire or the flame of a cutting torch, as well as to the eyes. In addition, once the seals have been heated to such temperatures, they are dangerous to handle even after they have cooled and should not touch the skin. If it is necessary to handle bearings with seals that have been subjected to high temperatures, such as when dismounting the bearing, the following safety precautions should be observed.
 - always wear protective goggles, gloves and an appropriate breathing apparatus
 - place the remains of the seals in an airtight plastic container marked with a symbol for "material will etch"
 - follow the safety precautions in the appropriate material safety data sheet (MSDS).
- If there is unintentional contact with the seals, wash hands with soap and plenty of water and flush eyes with plenty of water and consult a doctor immediately. If the fumes have been inhaled, consult a doctor immediately.
- The user is responsible for the correct use of the product during its service life and its proper disposal. DONLY takes no responsibility for the improper handling of fluoro rubber seals or for any injury resulting from their use.

使用说明

The Operation Manual

2. 轴承

- 齿轮箱轴承采用的是球面滚子轴承，它可以自动调心，因此可以承受较大的对准误差，如轴与轴承座之间的角度误差或轴的挠曲。特有结构使得它不仅具有很高的径向负荷承载能力之外，还可以承受作用在两个方向的重轴向负荷。如果轴承的安装正确，允许的轴向负荷为： $F_{ap}=0.003Bd$
- 式中的 F_{ap} 为最大的允许轴向负荷（kN）， B 为轴承宽度（mm）， d 为轴承内径（mm）滚动轴承的寿命通常是工作寿命，表示轴承在实际工作条件下，发生故障之前实际达到的寿命。而轴承寿命计算只是对轴承群体和失效概率为 10%、可靠性为 90% 而言的。在实际使用时出现的故障通常不是疲劳所致，更多的情况是污染、磨损、不对中、腐蚀所致，又或是保持架、润滑剂或其它引起的故障。因此对轴承的保养尤为重要，每年齿轮箱大修和新设备开始运行时，都要对轴承进行清洗，随时检测油品清洁度或更换润滑油，虽然轴承材料都经过特殊的热处理，可以长时间在高温下运行，但 DONLY 建议轴承最好在 80℃ 以下运行，最高不超过 100℃。

2. Bearing

- The gear unit adopts the ball and roller bearings, it can auto adjust center, so it can receive center error of shaft and gear case's hole or shaft's bend. The special structure make it not only receive very high radial load, which make it but also receive two direction axial load. If the bearing is correctly installed, allowable axial load is $F_{ap}=0.003Bd$. F_{ap} is the largest allowable axial load(kN), B is bearing's width (mm), d is bearing's interior diameter (mm).
- Life of the bearing usually is bearing's actual working life, which denotes the bearing actually used time before it go wrong under actual working condition. But calculation of life of the bearing only express passel bearing under failure probability is 10% and reliability is 90%. That the bearings go wrong during the actual using commonly is caused by fatigue. It is usually mostly used by pollution, abrasion, wrong center, erode, lubricant etc. So it is very important for bearing's maintaining. The consumer should rinse bearings during the gear unit is annually heavy repaired or new equipment begin running, and inspect cleanliness of lubrication or replace lubrication. Although the bearings' material are especial heat treatment, runned under the high temperature for long time. DONLY suggest bearings had better run an below 80℃, not more tallest than 100℃.

8.9 备品和备件

齿轮箱运行一段时间后，易损件和零部件会出现损耗或磨损，为了提高设备的运行效率和维修时间，通常需要准备一些备品备件，DONLY 建议按如下运行时间准备备品备件。

8.9 Spare parts

- Some parts may be wearing down after the gear unit runs a period of time. In order to improve the running efficiency and reduce the maintaining time, having some stock and spare parts is definitely necessary. Preparing spare products and parts according to the following running time is advised by DONLY.

运行时间 Running time	类型 Item	单位 Units	数量 Qty	备注 Remark
6 个月 6 months	高速轴油封 The oil seal of input shaft	个	2	型号请向制造商咨询 Please inform the manufacturer
12 个月 12 months	低速轴油封 The oil seal of output shaft	个	2	型号请向制造商咨询 Please inform the manufacturer
	联轴器弹性体 The elastomer for coupling	件	2	型号请向制造商咨询 Please inform the manufacturer
	仪器仪表 The apparatus & gauges	件	1	型号请向制造商咨询 Please inform the manufacturer
	润滑系统中的易损件 The expendables of the oil station	件	1	
18 个月 18 months	高速轴轴承 The bearing of the input shaft	个	2	型号请向制造商咨询 Please inform the manufacturer
	高速齿轮轴 The 1st stage pinion	件	1	
	高速级齿轮 The 1 st stage gear	件	1	
24 个月 24 months	轴承（高速轴除外） The bearing (except the input shaft)	套	1	型号请向制造商咨询 Please inform the manufacturer
24 个月以后 24 months later	大修后判定需要采购的零部件 The prepared parts are cognized after maintenance	件	1	

注：相同型号的备件可只采购一件备件。

Note: Stock one part if the type of the spare parts is same.

8.10 故障与处理

1. 注意事项

- 发生异常时的诊断，请严格按照本实用说明书实施。在未查明原因采取对策之前，绝对不要使机器运转。
- 运行中有异常情况应立即停机，并查找原因。如果原因未明而继续运行机器，可能会导致更严重事故的发生。
- 即使故障已经排除，仍应注意再次发生故障的可能。因此，应该检查所有发生故障部位周围的零部件。
- 故障产生的原因是错综复杂的，需要做多方面的调查与研究。以下叙述的是一般的现象及原因。

2. 故障检修项目

- 齿轮设备在质保期间出现的运转故障，如需要修理，应由制造商的服务人员来完成。维修或更换备件后，出现下述情况（见表 1）仍无法解决的，请咨询制造商。

8.10 Fault and solutions

1. Notes

- For the diagnosis of abnormalities, please follow the Operation Manual. Before the reason of abnormality is found and remedy measure is adopted, never run the machine.
- Stop the equipment if any abnormality is detected during operation and search for its reason. Further operation without inspection may lead to more serious accident.
- Even after the problem is solved, there is still the possibility for the same failure to reoccur. So inspection should be carried out for all neighbouring parts.
- Failures have complicated reasons, so comprehensive investigation and study are necessary. The following are frequent troubles and their reasons.

2. Troubles and solutions

- If the gear unit has problem during the guaranteed period, the repair should be done by service persons from DONLY company.

表 1 故障与处理
Trouble And Solutions

故障 Trouble	检查内容 Items to be inspected	应采取的措施 Measure to be taken
异常噪声或振动 Abnormal noise or vibration	齿轮副侧隙，齿面接触斑点① Backlash and contact pattern ①	重新配磨齿轮（通知制造商） Regrinding and reassembly (inform DONLY)
	箱体变形 Distortion in the housings	调整箱体下的垫块（片） Adjust the heel blocks (plates) under the housing
	齿轮箱是否过载 Whether the gear unit is overloaded	降低负荷至额定功率范围内 Decrease the load into the nominated range
	润滑油质量 Quality of the lubrication oil	换油并清洗过滤器 Change oil and clean the filters
	润滑系统是否正常 Whether the lubrication system is functioning normally	调节喷油量及喷油位置等 Adjust the oil spray quantity and nozzle orientation
	齿轮、轴承是否有损坏 Whether there are damages in gears and bearings	更换齿轮、轴承 Replace gears and hearings
	设备固定松动 The equipment is no longer safely fixed	重新固定、拧紧螺栓或更换螺栓 Refasten the equipment, tighten or change bolts
	联轴器是否有损坏 Whether there are damages in the couplings	更换联轴器 Replace couplings
	联轴器是否对中 Alignment of couplings	重新校对并符合要求 Readjust
油封渗漏油 Oil leaking from the oil seal	油封唇口是否损坏或油封是否老化 Whether the tip of oil seal has been damaged or the whole seal has aged	更换油封 Replace the oil seal
	腔体孔径过大或损伤 Whether the oil return hole is through	更换透盖 Clean the oil return hole and check quality of the lubrication oil
	回油孔是否通畅 The aperture in the cover is too small	清洁回油孔，检查润滑油质量 Remachine the cover, or replace the oil seal
	腔体孔径小 The aperture in the cover is too large, or scratches	重新加工腔体孔、更换油封 Replace cover
	装油封处轴颈光洁度，是否有划痕 Roughness of the shaft journal under oil sea, whether there are scratches	打磨并用金相砂纸抛光，如严重更换备件 Grind and polish using abrasive paper, if the damage or scratch is serious, replace the shaft with spare parts
	进油量是否过大 Whether the input oil quantity is too large	调节油量（加节流塞） Adjust the oil quantity (add a throttle)
	油封唇口与轴颈的配合是否太松 Fitting between the sea lips and the shaft	调节油封内弹簧长度 Adjust the spring inside the oil seals
	油封与轴颈的同轴度是否符合要求 Coaxiality between the oil seals and the shaft journal	重新加工端盖上装油封的孔 Remachine the seat hole of oil seal in the cover

使用说明

The Operation Manual

故障 Trouble	检查内容 Items to be inspected	应采取的措施 Measure to be taken
轴承温升高 Excessive temperature rise at bearings	润滑是否充分 Whether the lubrication is sufficient	加大进油量检查润滑油质量 Enlarge the input oil quantity and check quality of the lubrication oil
	轴承轴向间隙 Axial clearances of bearings	重新调整② Readjust ②
	轴颈尺寸是否超差 Whether the shaft journal is out of dimensional tolerance	重新修磨（通知制造商） Regrinding and reassembly (inform DONLY)
	轴承孔尺寸偏小 Whether the bearing bore is too small	重新加工（通知制造商） Remachine (inform DONLY)
	轴承内孔是否有杂质 Whether there are foreign substances in bearings	彻底清洁轴承 Clean bearings completely
	进油温度偏高 Too high temperature of the input oil	检查冷却管、冷却水温度，加大进水量 Check the temperatures of cooling pipes, cooling water, increase input water quantity
	润滑油老化 Aging of the lubrication oil	重新更换润滑油 Replace lubrication oil
	油泵故障 Pump trouble	更换油泵或致电设备制造商咨询 Replace oil pump or consult the manufacturer
	轴承损坏 Whether the bearing is damaged	更换轴承 Replace the bearing
	联轴器是否对中 Alignment of couplings	重新对中 Realigning
	是否超过额定载荷 Whether the gear unit is overloaded	降低使用载荷 Decrease the load into the nominated range
	轴承外径尺寸超差 Whether the bearing with outside diameter is out of the dimensional tolerance	更换轴承 Realigning bearing
油压过低 Too low oil pressure	管路是否有泄漏 Leakage in the piping	紧固或堵焊泄漏点 Fasten or weld the leakage point
	压力表或油泵损坏 Damages in pressure gauges or oil pump	更换压力表或油泵 Replace pressure gauges or oil pump
	过滤器是否堵塞 Whether the filter is blocked	清洗过滤器 Clean filters
	喷油量是否过量 Whether the spray quantity is too large	根据需要各润滑支路加节流塞 Add throttles into every branch pipes as needed
	安全阀设定值是否合适 Whether the safety valves are set correctly	将设定值调节为 0.5Mpa 左右 Set the value to about 0.5Mpa
油温高及润滑装置故障 High oil temperature and failure of lubrication device	油老化或油脏 Oil ages or gets dirty	过滤或更换油品 Filterate or change the oil
	冷却水流量不足 Insufficient cooling water volume	加大冷却水流量 Increase the flow quantity of cooling water
	冷却水水温高 Too high temperature of the cooling water	降低冷却水温度 Lower the temperature of the cooling water
	冷却器堵塞 The cooler are blocked	清洁冷却器或更换 Clean or change the cooler
	其它 Miscellaneous	请按《齿轮箱稀油站使用说明书》操作 Please follow Operation Instruction of the Oil Station of Gear unit

注：① 齿轮副最小侧隙为 0.35~0.55mm，齿面接触斑点为齿高方向 $\geq 50\%$ ，齿长方向 $\geq 75\%$ 。

② 调心轴承的轴向间隙为 0.3~0.5mm，其余各轴上的固定端轴承内圈必须紧贴轴肩或定距环，用 0.05mm 塞尺检查不得塞入。

Notes: ① Min.backlash of the gear pair is 0.35~0.55mm, contact spot in tooth width $\geq 50\%$, in tooth length $\geq 75\%$.

② Axial clearance of self-aligning bearings 0.3~0.5mm. Bearings at the fixed ends of other shafts should have inner rings pressed tight to shaft shoulder or spacer ring, i.e. the 0.05mm feeler gauge can't be slipped into the clearance.

8.11 有关质保内容

本公司产品的保证范围，只限定在本公司制作的产品，非本公司制造的产品不在此保证范围内。

质保期和质保内容

8.11 About warranty content

- The guarantee range is limited to manufactured by our company. Guarantee period and content.
- Guarantel period and content

质保期 Guarantee period	出厂后 12 个月内为质保期。 12 months after delivery
质保内容 Guarantee content	在质保期内，按照使用说明书进行准确的安装、连接及保养管理，或在另外的协议条件下进行正确运行，在上述情况下，本产品发生故障时（除以下保证外）本公司无偿地按照本公司的判断进行修理或提供代用品。但是，当本产品与客户的其他装置连接在一起时，从该装置等的拆卸、安装及其他附带工程费用、运送等需要的费用、作业损失和其他间接损害，一切均不予补偿。 Within the guarantee period, please carry out installation, connection and maintenance in strict accordance with operation instruction or any other agreement accepted. If the abovementioned conditions are met, in case of malfunction our company will provide, basing on our judgement, maintenance or substitute products free of charge with exception of the following cases: when this product is connected with other device of the customer, we won't pay for dismantlement and reconnection between the product and such device, neither for attendant engineering costs and transportation fee. Neither will we make compensation for direct/indirect losses caused by the malfunction.
适用质保除外 Exceptions for the guarantee	以下项目，不包括在使用质保期以内。 1. 因本产品的安装、与其他装置等的连接有问题时发生的故障。 2. 未按照本公司的规定的使用说明书中的保管内容、对本产品进行保管，保养管理不充分，未进行正确处理使用，从而引起的故障。 3. 运行时超过规格范围、并因不知道其他公司的运行条件、使用状态而引起的故障，或使用了本公司推荐以外的润滑油而引起的故障。 4. 由客户连接的装置等有问题或因特殊规格引起的故障。 5. 因对本产品进行改造和结构变更而引起的故障。 6. 因客户自己提供的零部件或自己指定的零部件有问题而产生的故障。 7. 因地震、火灾、水灾、盐害、气体损害、雷击及其他不可抗拒的原因造成的故障。 8. 即使是按照正常的使用方法，滚动轴承、油封等磨损部件属于自然消耗、磨损、老化时，应按照该消耗部件的有关保证。 9. 以上各项不能指责其他公司的事由引起的故障。 The following conditions are not included inside guarantee 1. Problems arise from incorrect installation of the product or poor connection with other device. 2. Troubles caused by not obeying our company's storage instruction, insufficient maintenance and care or incorrect handling and operation. 3. Troubles caused by exceeding the specified capacity, not understanding operation conditions and application status by other supplies, or using lubrication oil other than the recommended brands. 4. Troubles caused by fault in the connected device or because of special models. 5. Faults caused by modification or structural changes on the product. 6. Faults arise from problems in parts supplied or appointed by customer. 7. Faults caused by force majeure such as earth quake, fire, flood, salt damage, gas damage, lightning stroke etc. 8. Even under correct operation, the guarantee of wearing parts such as rolling bearings, oil seals etc. should also follow the corresponding provision of normal consumption, wearing and aging. 9. Faults caused by the above items but can't be ascribed to other companies.

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