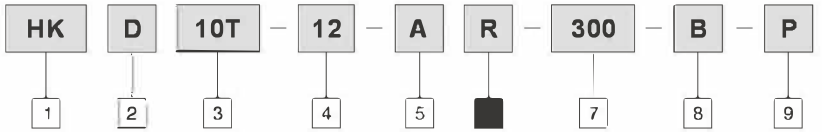
1、产品说明 Product Introduction

1.1 HK系列蜗轮丝杆升降机（又名千斤顶）；
1.2 具有结构紧凑、体积小的特点；
1.3 安装方便、形式多；
1.4 可靠性高、寿命长；
1.5 具有起升、下降及借助辅件推进、翻转等多种功能；
1.6 可单台使用，也可多台组成使用；
1.7 动力源广泛，可用电动机或其它动力直接带动，也可以用手动；
1.8 通常用于低速重载的场合。广泛应用于冶金、机械、建筑、水利、医疗、化工等各个行业。

1.1 HKseries worm gear screw lifter fother name is Jack);
1.2 Compact structure, smalf size;
1.3 Easy mounting, varied types;
1.4 High reliability. Long service life;
1.5 With the function of ascending, descending, thrusting, overturning;
1.6 Can be applied in one unit or multiple units;
1.7 Wide motivity. It can be drived by electrical motor and manual force;
1.8 It is usually used in low speed situation, widely used in the fields of metallurgy, mechanical, construction, chemical, irrigation works, mediat treatment.

1、型号说明 Model Introduction



3 产品代码
HK--蜗轮丝杆升降机
Products code
HK—worm gear linear actuator

2 输入轴联接方式
D—带电机法兰
无代码—基本型
Connector of input shaft
D—with motor frange
Non-code-basic

3 规格用承载吨位标示
Specification expressed by the carrying tonnage

4 传动比
12
Ratio
12

5 安装方式代码 A型
A、B--基本型
C、D—止旋构造型
E、F--活动螺母构造型
详见“3、安装方式”
Mounting option code A
A、B—Basic model
C、D--Screw fluctuate without rotation
E、F—Screw rotate without fluctuation
more information from 3 Mounting option

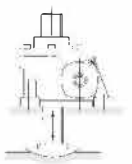
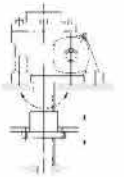
6 丝杆头部型式代码
Code of screw head
R型
R型（圆柱式）R-Column type
H型（栓孔式）H-Bolt hole type
S型（螺纹式）S-Screw type
T型（顶板式）T-Copinhg type
详见“产品图片”

7 丝杆行程
300mm
共有100、200、300、400、500、600、800、1000mm 8种规格，根据使用情况选择，如需要其它长度行程，也可定做
Total 8 species model: 100,200 300,400, 500, 600, 700, 800, 1000mm, choose according to using situation. If other model needed, canbe made to order

8 轴指向
Shaft direction
B
BSL系列共有A、B、C三种
BSLD系列共有A、B、C、D四种详见“轴指向表示”
BSL series have A, B and C three species
BLSD series have A, B, C and D four species

8 护管
Safeguard pipe
P--带护管
无码—不带护管
P—With safeguard pipe
Non-code-
Without safeguard pipe

3、安装方式 Mounting Option

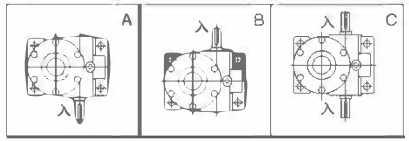
基本型 Basic model		止旋构造型 Screw fluctuate without rotation		活动螺母构造型 Screw rotate without fluctuation	
A	B	C	D	E	F
					

说明：
1、基本形式：螺母(蜗轮)转动丝杆上下移动，此为普通型升降机安装方式。
※注意：丝杆在升降时，会产生旋转力，所以必须做好防止旋转的措施。
2、止旋构造型：适用于顶端无连接下运转等各种不能实现防止旋转的场合。
3、若想在有限的空间增长行程，可选用活动螺母构造型。此构造为丝杆旋转，活动螺母移动。若行程较长时，轴端应采用支撑方式，可得到很好的传动效果。

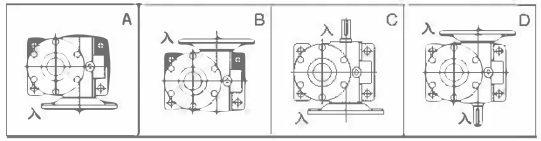
Explain:
1、Basic Model: Screw fluctuate with rotation. This is the installation for basic screw lifter.
※Notice: There will be rotation force when screw is ascending and decending. So it's needto prevent rotation.
2、Screw fluctuate without rotation: work under the situation than the shofe and hav't connection and the life can't rotate.
3、Screw rotate without fluctuation: To get the longer travel, this prodel screw rotate without fluctuation is an option, which screw rotate and nut move. If longer travel shaft and with bracket will archien high efficing.

4、轴指向表示 Express of Shaft Orientation

4.1 HK系列轴指向表示
Express of HK series Bearing orientation



4.2 HKD系列轴指向表示
Express of HKD series Bearing orientation



5、承载能力及选型参数 Capacity and Model Selection

型号规格 Model size	传动比 Radio	入力轴转速 1800r/min Input shaft revolution speed 1800r/min			入力轴转速 1500r/min Input shaft revolution speed 1500r/min			入力轴转速 1200r/min Input shaft revolution speed 1200r/min			入力轴转速 900r/min Input shaft revolution speed 900r/min			入力轴转速 600r/min Input shaft revolution speed 600r/min			入力轴转速 300r/min Input shaft revolution speed 300r/min		
		入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)	入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)	入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)	入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)	入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)	入功率(kw) Model size (kw)	起升力(kg) Lifter froce (kg)	起升速度(m/min) Hoist speed (m/min)
HK-2T	1/5	0.69	500	1.80	0.64	550	1.50	0.65	700	1.20	0.63	900	0.90	0.46	1000	0.60	0.37	1000	0.30
	1/10	0.37	500	0.90	0.37	550	0.75	0.37	700	0.60	0.37	950	0.45	0.37	1000	0.30	0.19	1350	0.15
	1/20	0.37	600	0.45	0.37	700	0.38	0.37	900	0.30	0.37	1200	0.23	0.19	1350	0.15	0.19	1350	0.08
HK-3T	1/6	0.98	700	1.80	0.93	800	1.50	0.88	950	1.20	0.91	1300	0.90	0.84	1800	0.60	0.42	1800	0.30
	1/12	0.66	950	0.90	0.64	1100	0.75	0.61	1300	0.60	0.57	1650	0.45	0.46	2000	0.30	0.37	2000	0.15
	1/24	0.37	950	0.45	0.37	1100	0.38	0.37	1300	0.30	0.37	1650	0.23	0.37	2000	0.15	0.19	2000	0.08
HK-5T	1/6	1.39	900	1.80	1.28	1000	1.50	1.24	1200	1.20	1.16	1500	0.90	0.87	1700	0.60	0.54	2100	0.30
	1/12	1.10	1350	0.90	1.01	1500	0.75	0.98	1800	0.60	0.87	2150	0.45	0.58	2150	0.30	0.37	2500	0.15
	1/24	0.78	1800	0.45	0.72	2000	0.38	0.69	2400	0.30	0.55	2550	0.23	0.42	2900	0.15	0.37	2850	0.08
HK-10T	1/8	2.12	1300	1.80	1.97	1450	1.50	1.85	1700	1.20	1.72	2100	0.90	1.66	3050	0.60	1.31	4800	0.30
	1/16	1.12	1300	0.90	1.04	1450	0.75	0.98	1700	0.60	0.95	2200	0.45	0.87	3050	0.30	0.69	4800	0.15
	1/32	0.80	1750	0.45	0.75	1950	0.38	0.69	2250	0.30	0.64	2800	0.23	0.63	4100	0.15	0.48	6400	0.08
HK-15T	1/8	2.00	1300	1.80	1.86	1450	1.50	1.75	1700	1.20	1.62	2100	0.90	1.57	3050	0.60	1.24	4800	0.30
	1/16	1.06	1300	0.90	0.98	1450	0.75	0.93	1700	0.60	0.89	2200	0.45	0.83	3050	0.30	0.65	4800	0.15
	1/32	0.75	1750	0.45	0.70	1950	0.38	0.65	2250	0.30	0.61	2800	0.23	0.59	4100	0.15	0.46	6400	0.08
HK-20T	1/10	2.66	1400	1.80	2.42	1850	1.50	2.25	1950	1.20	2.12	2450	0.90	1.93	3350	0.60	1.41	4900	0.30
	1/20	1.42	1600	0.90	1.47	1850	0.75	1.37	2250	0.60	1.28	2800	0.45	1.18	3850	0.30	0.86	5600	0.15
	1/40	1.14	2400	0.45	1.17	2800	0.38	1.09	3350	0.30	1.07	4400	0.23	0.93	5750	0.15	0.69	8400	0.08
HK-30T	1/12	3.62	1850	1.80	3.51	2150	1.50	3.39	2600	1.20	3.18	3250	0.90	2.94	4500	0.60	2.09	6400	0.30
	1/18	2.65	1900	1.20	2.68	2300	1.00	2.57	2750	0.80	2.45	3500	0.60	2.19	4700	0.40	1.56	6700	0.20
	1/36	1.66	2200	0.60	1.63	2600	0.50	1.60	3200	0.40	1.47	3900	0.30	1.36	5400	0.20	1.20	9600	0.10
HK-40T	1/12	4.15	1975	1.80	4.02	2300	1.50	3.81	2725	1.20	3.80	3625	0.90	3.48	4975	0.60	2.48	7050	0.30
	1/18	3.20	2125	1.20	3.20	2550	1.00	3.04	3025	0.80	3.03	4025	0.60	2.74	5450	0.40	1.94	7725	0.20
	1/36	2.14	2625	0.60	2.07	3050	0.50	1.98	3650	0.40	1.99	4875	0.30	1.80	6600	0.20	1.40	0300	0.10
HK-50T	1/7	9.47	2100	3.60	9.17	2450	3.00	9.02	2850	2.40	8.58	4000	1.80	8.20	5450	1.20	5.84	7750	0.60
	1/14	5.76	2350	1.80	5.71	2800	1.50	5.57	3300	1.20	5.39	4550	0.90	5.06	6200	0.60	3.57	8750	0.30
	1/28	4.07	3050	0.90	3.89	3500	0.75	3.91	4100	0.60	3.65	5850	0.45	3.48	7800	0.30	2.45	11000	0.15
HK-100T	1/8	16.3	3500	3.60	16.1	4000	3.00	15.8	5400	2.40	15.1	7100	1.80	14.8	9850	1.20	9.70	12950	0.60
	1/16	11.7	4300	1.80	11.6	5400	1.50	10.5	7200	1.20	11.00	9450	0.90	9.62	11800	0.60	7.08	17350	0.30
	1/32	8.65	5500	0.90	9.55	6800	0.75	7.35	10000	0.60	7.53	14300	0.45	7.02	15750	0.30	5.80	26050	0.15

6、升降机选型

6.1 总当量载荷计算

Ws=WmaxXfs

Ws--当量载荷　Wmax--最大载荷　fs--使用系数（详见附表1）

表1 使用系数 fs　Table 1 using coefficient(fs)

使用工况 using situation	平稳载荷，负荷惯性小 smooth load; light load inertia	轻微冲击载荷，负荷惯性中等 light shock load; mid load inertia	强冲击负荷，负荷惯性大 strong shock load; heavy load inertia
使用系数 using coefficient	1.0～1.3	1.3～1.5	1.5～3.0

6.2 单台升降机的当量载荷的计算

W=Ws/(S×fd)

W--单台当量载荷　Ws--当量载荷　S--联动台数　fd--联动系数（详见附表2）

表2 联动系数 fd　Table 2 linkage coefficient(fd)

联动台数 Linkage quantity	1	2	3	4	5～8
使用系数using coefficient	1	0.95	0.9	0.85	0.8

6.3 丝杆行程选定

在充分考虑丝杆运动惯性、各种顶端输出部件等各种情况，选择有充分余量的丝杆行程。

6.4 暂定升降机型号

根据载重、升降速度、行程、驱动源暂时选定升降机型号（详情可参考“5、承载能力与选型参数”）。

6.5 丝杆计算（详见表3，丝杆行程用L表示，单位(unit)：mm）

表3 丝杆计算　Table 3 screw calculate

型号 Model	丝杆直径 Screw dia	护管长 length of protect pip	丝杆头部S型 "S" type screw end		丝杆头部H型 "H" type screw end		丝杆头部R型 "R" type screw end		丝杆头部T型 "T" type screw end	
			总长=L+SC	牙长=总长+SD	总长=L+HB+HD	牙长=总长-HB-HE	总长=L+RB	牙长=总长+RC	总长=L+TE	牙长=总长-TF
HK-2T	Tr26×5	L+55		总长-40		总长-55-20	L+165	总长-55	L+135	总长-25
HK-3T	Tr32×6	L+60	L+180	总长-50	L+25+195	总长-65-25	L+195	总长-65	L+160	总长-30
HK-5T	Tr38×6	L+60		总长-50		总长-65-25	L+195	总长-65	L+160	总长-30
HK-10T	Tr46×8	L+65	L+220	总长-60	L+32+255	总长-95-32	L+225	总长-65	L+200	总长-40
HK-15T	Tr52×8	L+65		总长-60		总长-95-32	L+225	总长-65	L+210	总长-50
HK-20T	Tr65×10	L+75	L+260	总长-80	L+35+295	总长-115-35	L+250	总长-70	L+235	总长-55
HK-30T	Tr75×12			总长-80		总长-135-44	L+295	总长-75	L+285	总长-65
HK-40T	Tr80×12		L+360	总长-100	L+54+410	总长-150-54	L+355	总长-95	L+330	总长-70
HK-50T	Tr90×14			总长-120		总长-165-64	L+430	总长-115	L+390	总长-75
HK-100T	Tr100×16		L+495	总长-150	L+70+545	总长-200-70	L+485	总长-140	L+445	总长-100

6.6 丝杆稳定性校核

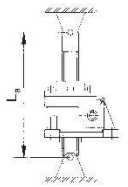
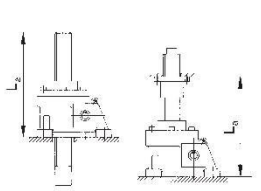
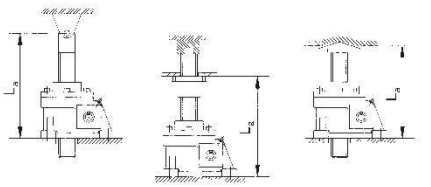
$P_{cr}=fm\times(d^2/La)^2$

应确保$P_{cr}>w\times Sf$(一般Sf=4)

Pcr--丝杆临界载荷(N)　fm--长度系数(详见附表4)　d--丝杆底径(n3m)(详见附表5)

La--作用点间距离(rrlm)　W--单台升降机当量载荷(N)　Sf--安全系数(一般取4)

表4 长度系数(fm) Table 4 Length coefficient

		
两端支撑 fm=10×10^4 Two ends sustation	底座固定轴端自由 fm=2.5×10^4 One shaft end fixed the other free	底座固定轴端支撑或固定 fm=20×10^4 Base shaft end fixed the other side uphold or fixed

6.7 丝杆转速校核

$nc=96\times10^6\times fn\times d/L_b^2$

ns=nl/i应确保nc>ns

nc--丝杆许用转速(r/min)　ns--丝杆回转转速(r/min)　d--丝杆底径(mm)　i--减速比

nl--输入轴回转转速(r/min)　fn--支撑系数(详见附表6)　L_b--支撑间距离(mm)

6.8 输入功率校核

$p=n_1\times p_1\times w\times10^{-3}/(60\times i\times\eta)$ 应确保P<P额

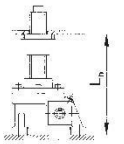
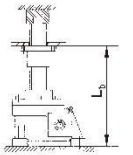
p--所需输入功率(KW)　p_1--丝杆螺距(mm)　n_1--输入轴回转转速(r/min)

W--当量载荷(KN)　i--减速比　η--综合效率

表5 丝杆底径 D Table 5 Diameter of screw bottom

型号 Model	HK-2T	HK-3T	HK-5T	HK-10T	HK-15T	HK-20T	HK-30T	HK-40T	HK-50T	HK-100T
	HK35	HK40	HK50	HK60	HK60B	HK70	HK100	HK120	HK130	HK150
丝杆底经 Diameter of screwing bottom	20.5	25	31	37	43	54	62	67	74	82

表6 支撑系数fn Table 6 Sustaion coefficient(fn)

	
两端自由 Two shaft end free fn=0.36	两端支撑 Two shaft end fixed fn=1.56

6、Model Selection for Screw Lifter

6.1 Total current load calculate

Ws=Wmax×fs

Ws--current load　Wmax--max load　fs--using coefficient (more information from table1)

6.2 Current load calculate of unit screw lifter

W=Ws/(S×fd)

W--unit current load　Ws--current load　S--linkage quantity

fd--linkage coefficient(more information from table 2)

6.3 Stroke of screw option

Choose adequate stroke of screw with concerning enough screw movement inertia...

6.4 Choose screw model

Choose screw model according to capacity, lifting speed, stroke and driveing fountainhead.

6.5 Screw calculate(more information from table 3)

6.6 Screw stability check

$P_{cr}=fm\times(d^2/La)^2$　Should insure $P_{cr}>w\times Sf$(usual Sf=4)

Pcr--Screw critical loading(N)　fm--Length coefficient(more information from table 4)

d--diameter of screw bottom(mm)(more information from table 5)　La--working length(mm)

W--Current load of unit screw lifter(N)　Sf--security coefficlent(usual Sf=4)

6.7 Screw speed check

$nc=96\times10^6\times fn\times d/L_b^2$

ns=nl/i should insure nc>ns

nc--screw allowed speed(r/min);　ns--screw screwing speed(r/min);

d--diameter of screw bottom(mm);　i--ratio;　nl--input shaft screwing speed(r/min);

fn--Sustation coefficient(more information from table 6);　L_b--the distance between sustation(mm)

6.8 Input power check

$p=n_1 \times p_1 \times w \times 10^{-3}/(60 \times i \times \eta)$ should insure $P<P_{rated}$

p--needed input power(KW); p_1--axial pitch distance(mm); n_1--input shaft screwing speed(r/min)

W--current load(KN); i--ratio; η--general efficiency

7、注意事项

7.1 请严格按承载能力表选择合适的速比和与之对应的具有充分裕度的载荷的升降机；

7.2 升降机工作时应控制减速机表面和升降螺母表面温度在-15℃～80℃；

7.3 升降机不得连续运转，单台升降机的负荷时间率(T%)以30分钟为单位计算，不得超过20%；

$$\text{负荷率T\%}=\frac{\text{1动作周期的工作时间}}{\text{1动作周期的工作时间+1动作周期的停歇时间}}\times 100\%$$

7.4 必须保证有充足的驱动源动力；

7.5 升降机理论上有自锁功能，但在振动冲击较大的场合会造成自锁功能失灵，请务必加制动装置；

7.6 升降机使用环境：

使用环境 Usingsituation	室内无雨水侵入的场所 Norain and water
周围空气 Ambient air	灰尘为一般工厂状况 Dust: usual condition for mill
环境温度 Ambient temperature	-15℃～40℃
相对湿度 Comparatively humidity	85%以下 Below 85%

7.7 升降机工作时一般不允许有横向载荷，若有横向载荷时，请加导向装置。

7、Notes

7.1 Select the model with proper ratio and load;

7.2 The surface temperation of speed reducer and nut should be controlled in -15℃～80℃, when the screw lifter is working;

7.3 The screw lifter cannot work all the time. The unit is thirty mins for duty ratio of unit one and can not exceed 20%;

$$\text{Duty ratio (T\%)}=\frac{\text{Time under working/cycle}}{\text{Time under working/cycle+interval/cycle}}\times 100\%$$

7.4 Insure adequate drive fountainhead;

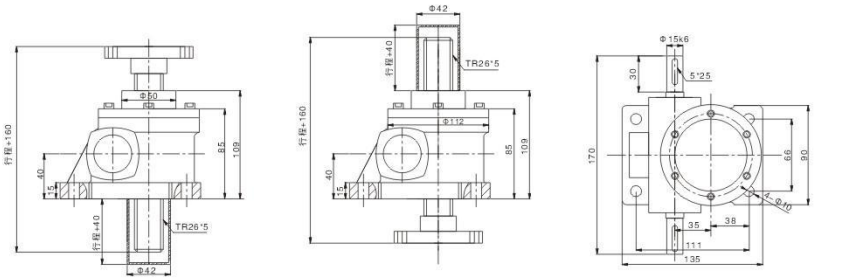
7.5 Theoretically screw has self-lock function, butthe self-lockfunction may not work in heavy shockcondition;

7.6 Using situation for screw lifter;

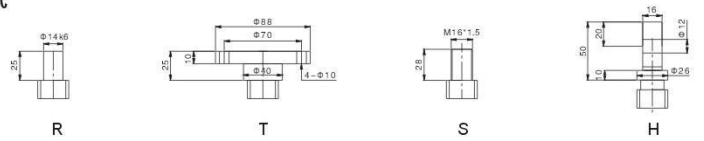
7.7 Transverse load is not allowed when screw lifter is wo rking. If transve rse load occured, pls add direction setting.

HK2T装配图

Ⅰ型结构型式

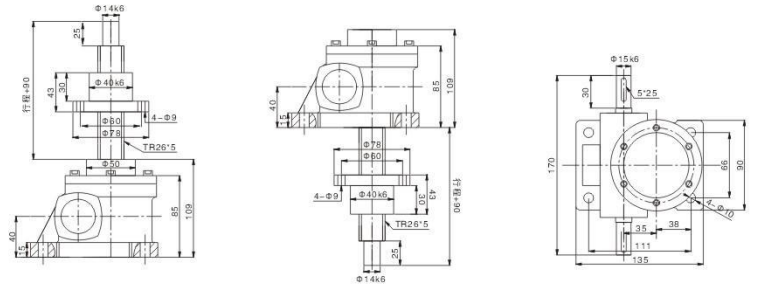


丝杆头部型式



R T S H

Ⅱ型结构型式

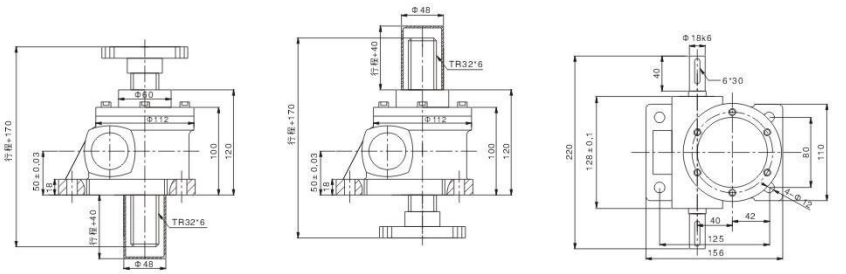


丝杆头部型式

R S

HK3T装配图

Ⅰ型结构型式



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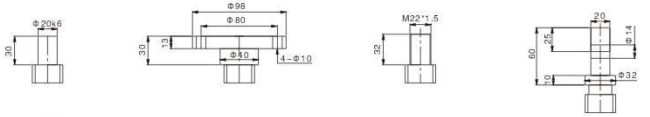
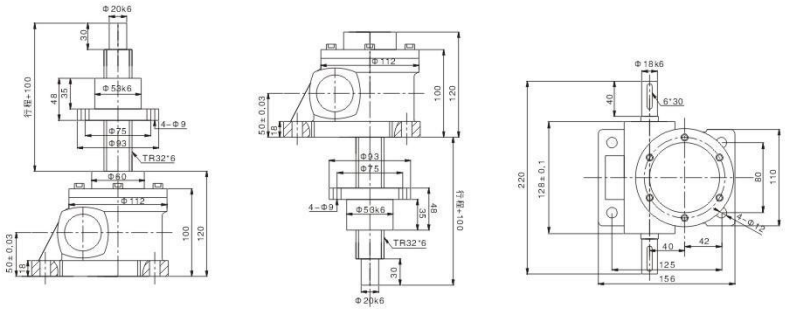


R　　T　　S　　H

Ⅱ型结构型式

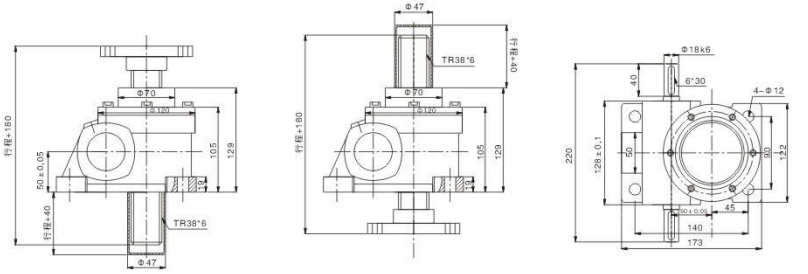


丝杆头部型式

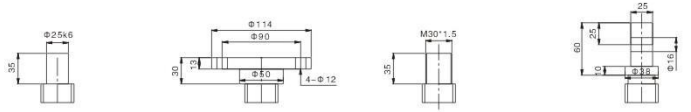
R　　S

HK5T装配图

Ⅰ型结构型式

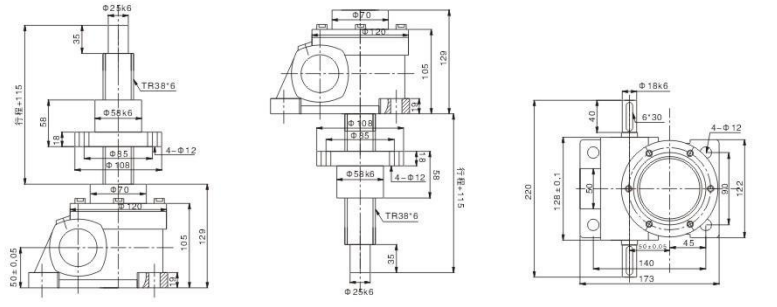


丝杆头部型式



R　　T　　S　　H

Ⅱ型结构型式

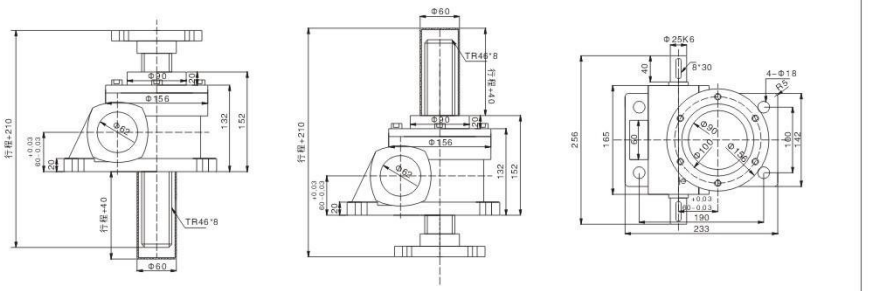


丝杆头部型式

R　　S

HK10T装配图

Ⅰ型结构型式



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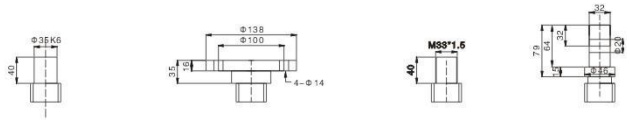
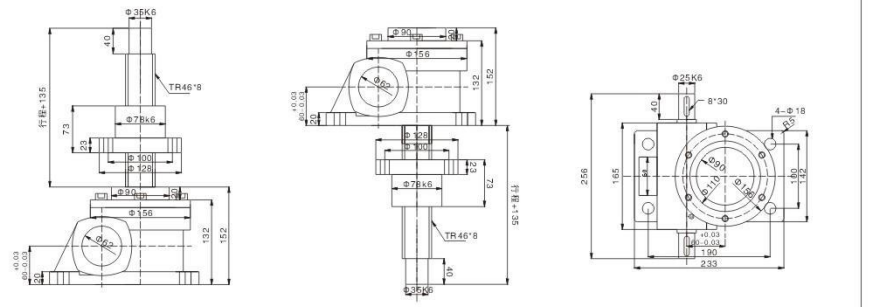


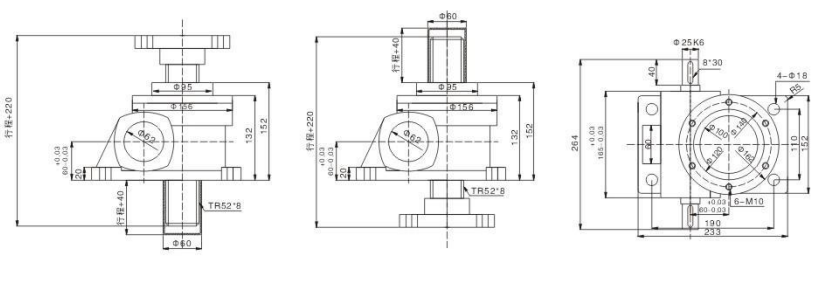
Ⅱ型结构型式



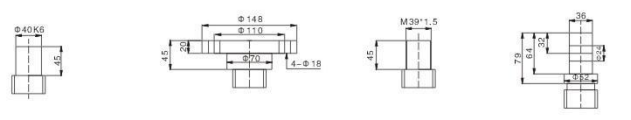
丝杆头部型式

HK15T装配图

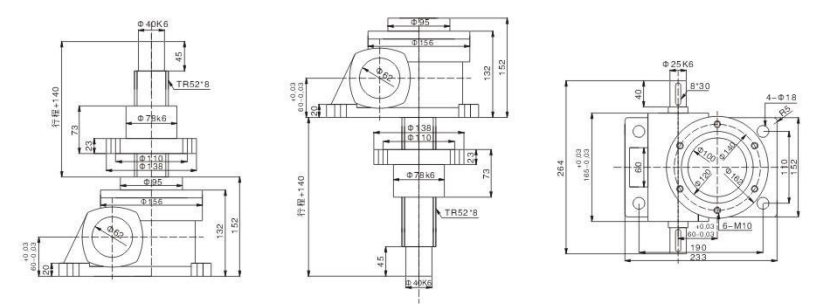
Ⅰ型结构型式



丝杆头部型式



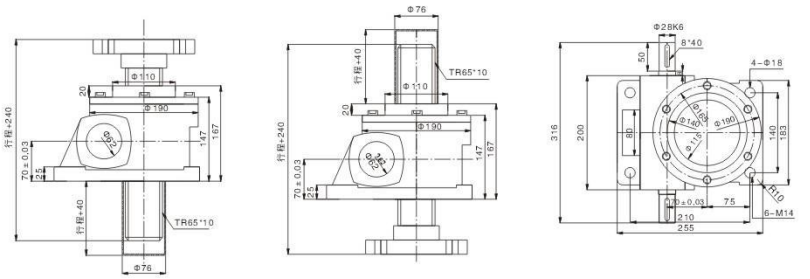
Ⅱ型结构型式



丝杆头部型式

HK20T装配图

Ⅰ型结构型式



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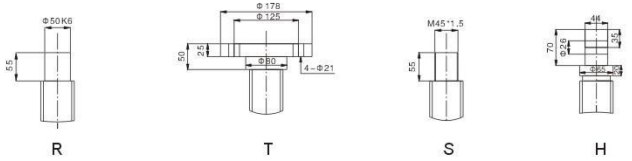

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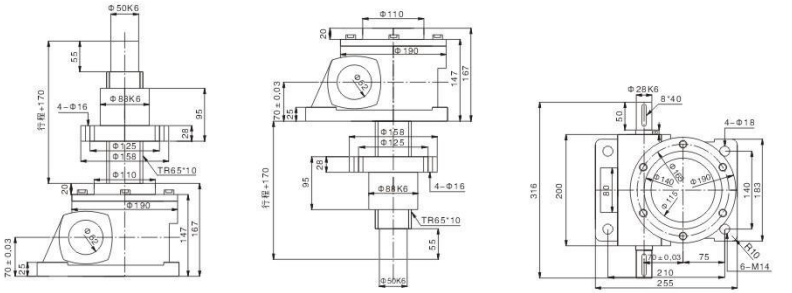
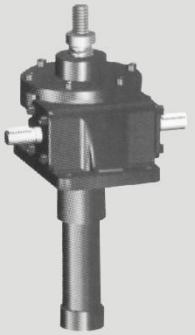


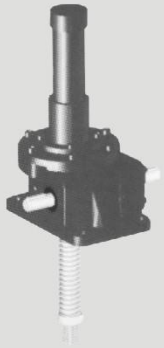
丝杆头部型式

JWM 系列

丝杆升降机

JWM series screw jack





JWMM梯形丝杆系列