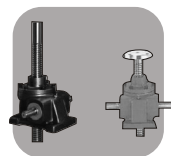




8 JW系列 丝杆升降机

JW series serew jack





8.1 JW系列丝杆升降机概述:

8.1.1 JWM型(梯形丝杆型)

低速、低频率

JWM型适用于低速、低频率的场合,主要构成部件为:精密梯形丝杆副与高精度蜗轮蜗杆副。

- 1)价格经济、结构紧凑、操作简单、保养方便。
- 2)低速、低频率:主要用于大负荷、低速与无须频繁工作的场所。
- 3)保持载重:梯形丝杆具有自动锁定功能,即使没有制动装置也可以保持载重。

注:在受到较大震动,冲击负荷时,可能使自锁功能失效,此时请外加制动装置。

8.1.2 JWB型(普通滚珠丝杆型)

高速、高频率

JWB型适用于高速、高频率和高性能的装置中,主要构成部件为精密滚珠丝杆与高精度蜗轮蜗杆副。

- 1)高效率:只需很小的驱动源,就可以产生很大的推动力。
- 2)高速化:与梯形丝杆相比,速度有很大的提高,能轻松而高速地运转。
- 3)使用寿命长:采用高质量的滚珠丝杆,使其工作寿命提高3倍以上。

注:本身无自锁功能,需外加制动装置或选择带有制动的驱动源。

8.1 JW series screw jack overview:

8.1.1JWM (Trapezoid screw)

LOW SPEED LOW FREQUENCY

JWM is suitable for low speed and low frequency.

- 1)Economical: Compact design, easy operation, convent maintenance.
- 2)Low speed, low frequency, low service frequency.
- 3)Self-lock: Trapezoid screw has self-lock function, it can hold up load without braking device when screw stops traveling.

Note: Braking device equipped for self-lock will be of malfunction accidentally when large jolt & impact load occur.

8.1.2JWB (General ball screw)

HIGH SPEED HIGH FREQUENCY

JWB is suitable for high speed, high frequency and excellent performance

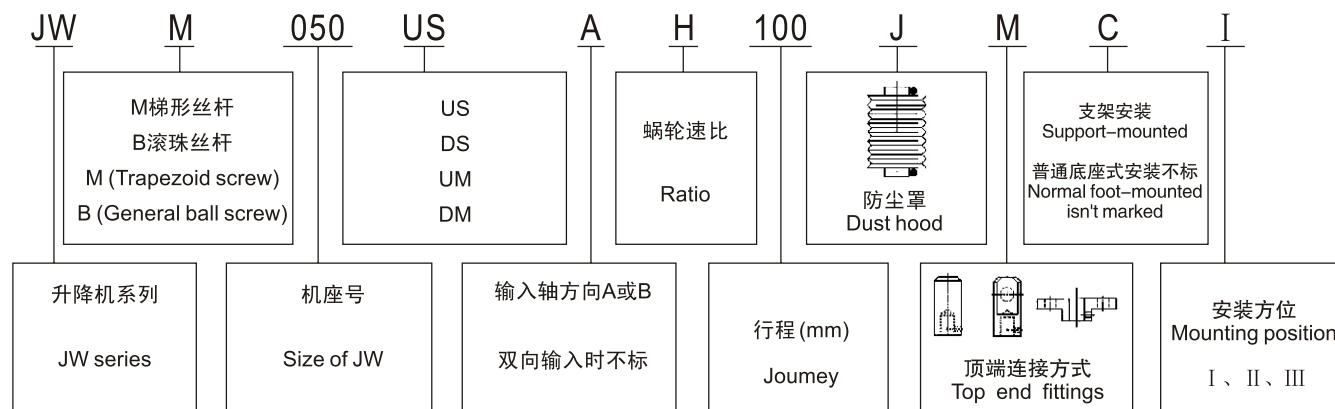
Main components: Precision ball screw pair and high precision worm-gears pair..

- 1)High efficiency: Rolling friction improve efficiency greatly, only a little drive power can generate great thrust force.
- 2)High speed: Rolling friction speed travel of screw easy..
- 3)Lifetime longer: High precision ball screw can make JWB's lifetime longer by 3 times comparing with JWM.

Note: Braking device or motor with braking devices are necessary when choosing JWB.

8.2. 型号表示方法举例:

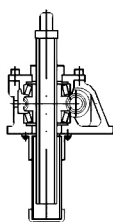
8.2.1基本形式和止旋构造升降机的型号表示方法:



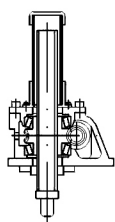
8.2.1.1基本形式(US, DS): US:压上 DS:吊下
螺母转动,丝杆上下移动并伴随附加的旋转运动,(如下图)

*请根据负荷方向、安装方向来选择合适的升降机(US或DS)

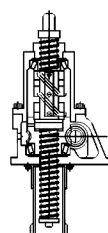
*丝杆轴在升降时,会产生旋转力,所以必须做好防旋转措施



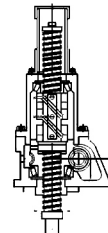
US



DS



US



DS

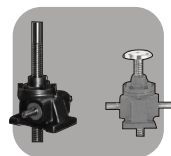
8.2 Illustration of types:

8.2.1 Plain mode and Mode with anti-rotation device:

8.2.1.1 Plain mode and (US, DS) US:UPRISE DS:DROP
Worm wheel rotating, threaded spindles travel up and down.
Ordinary mounting mode is applied here.

*Select US or DS according to the load and mounting positions.

*Anti-rotation measures must be taken because torque on screw will be caused when screw traveling up and down.

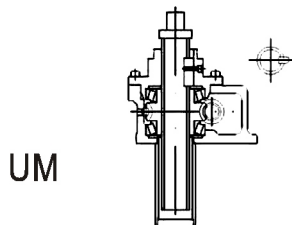


8.2.1.2 止旋构造 (UM, DM)。

UM:压上 DM:吊下

*丝杆只能上下移动

*请根据负荷方向, 安装方向来选择合适的升降机(UM或DM)

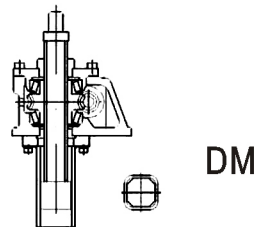


8.2.1.2 With Anti-rotation device.

UM:Uprise DM:Drop

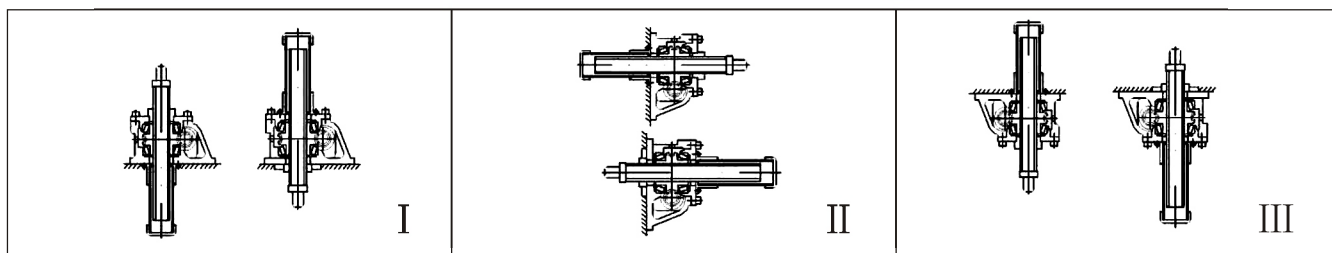
*No rotation of screw, which only travel up and down.

*Select UM or DM according to the load and mounting positions.



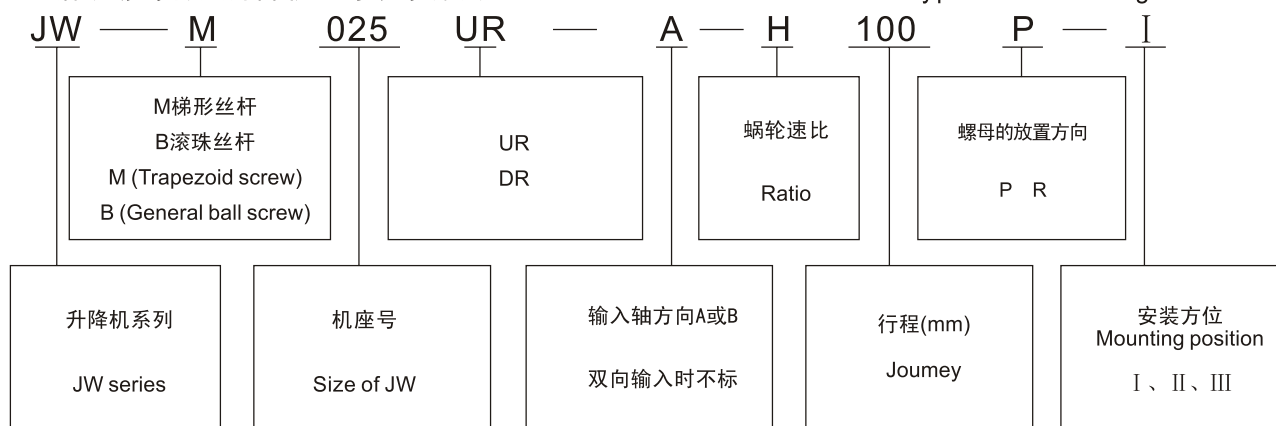
8.2.1.3 安装方位

8.2.1.3 Mounting position



8.2.2 活动螺母构造升降机型号表示方法:

8.2.2 Illustration of type with traveling nut



8.2.2.1 活动螺母构造 (UR, DR) UR:压上 DR:吊下

8.2.2.1 JW with Traveling nut UR:uprise DR:drop

一般情况下, 升降机必须具有因丝杆轴的升降而产生的行程和丝杆罩所需的空间, 若想在有限的空间内增长行程时, 使用此活动螺母构造非常适用(丝杆轴旋转, 活动螺母移动)。丝杆轴顶端为圆柱形, 所以在长行程时, 在轴端采用支撑方式可以得到很好的传动效果。

注:请根据负荷方向、安装方向来选择合适的升降机 (UR或DR)

In general, jack need enough space for screw's traveling journey and dust-hood. Using traveling nut can help jack realize longer traveling journey in limited space. The top end fittings are column, it can be a supporting point for a good transmission effect when a long atraveling journey is selected.

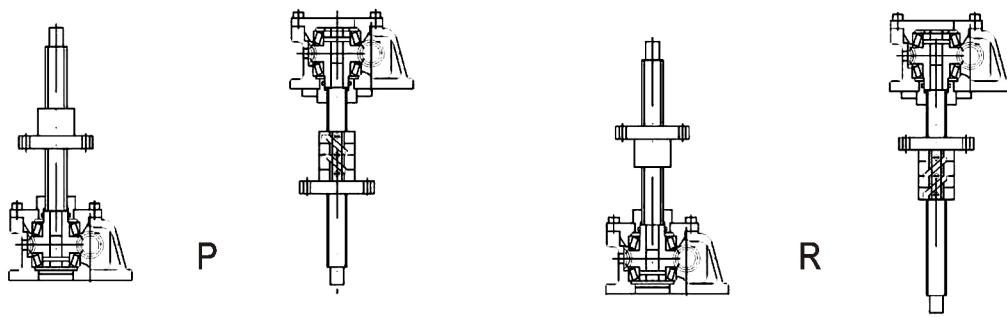
Select UR or DR according to the load and mounting positions

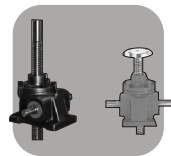
8.2.2.2 活动螺母的安装方向 (P, R)

选型和型号表示方法中, 还需注明螺母的放置方向 (如下图)

8.2.2.2 Mounting direction of traveling nut (P.R)

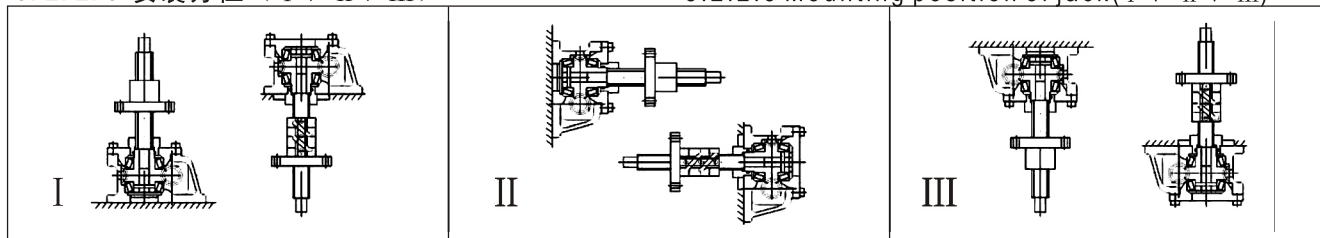
The mounting direction of traveling nut should be signed on drawing when selecting types.





8.2.2.3 安装方位 (I、II、III)

8.2.2.3 Mounting position of jack(I、II、III)



8.3 JW (梯形丝杆类型) 基本参数一览表

8.3 JWM (Trapezoid screw) basic parameter table

型号 Type		JWM010	JWM025	JWM050	JWM100	JWM150	JWM200	JWM300	JWM500	JWM750	JWM1000
最大负荷 Maximal load	(KN)	9.80	24.5	49.0	98.0	147	196	294	490	735	980
丝杆外径 Outer diameter of screw	(mm)	20	26	40	50	55	65	85	120	130	150
丝杆底径 Small diameter of screw	d (mm)	14.8	19.7	30.5	38.4	43.4	49.3	67	102	112	127
丝杆螺距 Pitch of screw	L1 (mm)	4	5	8	10	10	12	16	16	16	20
减速比 Ratio i	H速度 Speed	5	6	6	8	8	8	10 ^{2/3}	10 ^{2/3}	10 ^{2/3}	12
	L速度 Speed	20	24	24	24	24	24	32	32	32	36
综合效率 % Integrated efficiency η	H速度 Speed	21	21	22	22	20	20	19	15	13	13
	L速度 Speed	12	12	14	15	14	13	11	10	8	8
容许输入最大功率(KW) Permissible output maximal power	H速度 Speed	0.49	1.0	2.0	2.8	3.1	5.0	8.4	13.4	14.4	21.4
	L速度 Speed	0.36	0.46	0.63	1.4	2.2	3.2	4.6	5.7	7.2	9.4
空载扭矩 No-load torque T_0	(N-m)	0.29	0.62	1.4	2.0	2.6	3.9	9.8	19.6	29.4	39.2
容许输入轴扭矩* Permissible torque of input shaft	(N-m)	19.6	49.0	153.9	292.0	292.0	292.0	735	1372	1764	2450.0
最大负荷时所需输入轴扭矩** Required torque of input shant at maximal load (N-m)	H速度 Speed	6.2	16.1	48.7	90.7	149.0	238.1	400.1	856	1380.5	2040.9
	L速度 Speed	2.9	7.4	20.0	45.3	72.3	124.0	244.0	453.3	761.3	1278.3
输入轴每回转一圈丝杆(活动螺母)轴向位移量。 Axial journey of screw, when input shaft rotatable load (mm)	H速度 Speed	0.80	0.83	1.33	1.25	1.25	1.50	1.50	1.50	1.50	1.67
	L速度 Speed	0.20	0.21	0.33	0.42	0.42	0.50	0.50	0.50	0.50	0.56
最大载荷时容许输入轴回转速度 Permissible rotational speed of screw shaft at maximal load (rpm)	H速度 Speed	750	600	400	300	200	200	2.00	150	100	100
	L速度 Speed	1200	600	300	300	290	250	180	120	90	70
最大负转矩时丝杆回转扭矩(N-m) Rotational torque of screw at maximal load		20.1	65.1	201.5	503.6	813.2	1287.7	2531.9	5551.3	8921.8	13878.3

* 减速机输入轴的容许扭矩。(连动运转时请确认)
**包括无负荷空转扭矩的数值。

* Pirmission torque of shaft of reducer.
**Include torque under the condition of no-load operating.

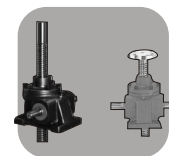
8.4 JWB (普通滚珠丝杆) 基本参数一览表

8.4 JWB (General ball screw) basic parameter table

型号 Type		JWM010	JWM025	JWM050	JWM100	JWM150	JWM200	JWM300	JWM500
最大负荷 Maximal load	(kN)	9.80	24.5	49.0	98.0	147	196	294	490
丝杆外径 Outer diameter of screw	(mm)	20	25	40	50	55	65	80	100
丝杆底径 Small diameter of screw	d (mm)	17.5	21.4	31.3	39.1	43.1	55.7	74.8	87
丝杆螺距 Pitch of screw	L1 (mm)	5	8	10	12	12	12	16	20
减速比 Ratio i	H速度 Speed	5	6	6	8	8	8	10 ^{2/3}	10
	L速度 Speed	20	24	24	24	24	24	32	32
综合效率 % Integrated efficiency η	H速度 Speed	61	62	64	63	63	62	56	60
	L速度 Speed	34	35	39	43	43	41	34	38
容许输入最大功率(KW) Permissible output maximal power	H速度 Speed	0.54	1.3	2.2	3.6	4.0	5.5	8.9	13.3
	L速度 Speed	0.27	0.63	1.0	1.9	2.1	2.8	4.1	6.5
空载扭矩 No-load torque T_0	(N-m)	0.29	0.62	1.37	1.96	2.65	3.92	9.81	19.6
保持扭矩 Keeping torque (N-m)	H速度 Speed	1.27	4.31	10.78	19.6	39.2	51.0	68.6	140.1
	L速度 Speed	0.26	0.91	2.4	5.8	11.8	15.0	19.5	41.2
容许输入轴扭矩* Permissible torque of input shaft	(N-m)	19.6	49.0	153.9	292.0	292.0	292.0	735.0	1372.0
最大负荷时所需输入轴扭矩** Required torque of input shaft at maximal load	H速度 Speed	2.8	9.0	21.5	39.1	77.0	104.5	169.6	317.5
	L速度 Speed	1.4	4.3	9.6	20.4	39.6	54.2	98.5	177.9
输入轴每回转一圈丝杆(活动螺母)轴向位移量。 Axial journey of screw, when input shaft rotatable load (mm)	H速度 Speed	1	1.33	1.67	1.5	1.5	1.5	1.5	1.88
	L速度 Speed	0.25	0.33	0.42	0.5	0.5	0.5	0.5	0.63
最大载荷时容许输入轴回转速度 Permissible rotational speed of screw shaft at maximal load	H速度 Speed	1500	1400	1000	890	500	500	500	400
	L速度 Speed	1500	1400	1000	890	500	500	400	350
最大负转矩时丝杆回转扭矩(N-m) Rotational torque of screw at maximal load		8.7	34.7	86.7	208.2	416.3	555.1	1040.9	2081.7

* 减速机输入轴的容许扭矩。(连动运转时请确认)
**包括无负荷空转扭矩的数值。

* Pirmission torque of shaft of reducer.
**Include torque under the condition of no-load operating.



8.5 注意事项:

- 1) 选择升降机时不论静载、动载、冲击载荷均不得超过其允许承受的最大载荷, 根据安全系数、使用行程、校对丝杆的稳定性选择具有充分容量的升降机;
- 2) 一定要注意丝杆轴转速与承受的负荷进行搭配, 对于升降机的容许最大负荷容许外加负荷、容许线杆轴的旋转速度等项目进行校验, 如果超过产品的数据将会造成升降机设备整体的重大损伤;
- 3) 升降机在工作时其减速部表面温度应控制在 $-15^{\circ}\text{C}\sim 80^{\circ}\text{C}$ 的范围以内, 确保活动螺母的表面温度也在上述范围内;
- 4) 输入轴容许转速为 $1500\text{r}/\text{min}$, 输入轴不得超过次转速;
- 5) JWM和JWB都不可连续运转:
单台升降机的负荷时间率(%ED)以30分为单位计算,
JWM(梯形丝杆类型)的符合时间内不得超过20%ED.
JWB(普通滚珠丝杆)的负荷时间率不得超过30%ED.

负荷时间率%ED=

$$\frac{\text{1动作周期的工作时间}}{\text{1动作周期的工作时间}+\text{11动作周期的停歇时间}} \times 100\%$$

- 6) 对于在不同一轴线上连接数台升降机时, 请务必对输入轴强度进行校核, 使每台升降机所承担的扭距都在其容许输入轴扭距以内;
- 7) 驱动源的起动扭距应确保在使用扭距的200%以上;
- 8) 在零摄氏度以下工作时因受润滑油粘性变化的影响使得整机效率下降, 所在必须选有充足的驱动源;
- 9) JWM型理论上具有自锁功能, 但因工作在振动冲击较大的场合是会导致自锁功能失灵, 因此须外加一制动装置或选择带有制动的驱动源。
JWB型升降机本身不具有自锁功能, 为了防止由于轴载荷和丝杆的自重而产生逆转, 必须外加制动装置或选择带有制动的驱动源, 请确保制动扭距大于保持扭距;

10) 升降机使用的环境如下

使用场所	Working Location	室内无雨水侵入的场所	Indoor location without rainwater
周围空气	Ambient Air	灰尘为一般工厂状态	Normal
环境温度	Ambient Temperature	$-15^{\circ}\text{C}\sim 40^{\circ}\text{C}$	
相对湿度	Relative Humidity	85%以下	Less than 85%

- 11) 当升降机工作在多灰尘的场所中时请务必选择防尘罩伸缩套附件来保护丝杆, 在室外使用时请务必考虑使用罩壳等装置, 使机器不直接受到风吹雨打;
- 12) 在升降机工作时, 不得进行人为的强行停机, 否则将使升降机受到严重破损;
- 13) 在有负载的情况下, 请不要将JWB型的输入轴驱动方式变为手动操作, 负载有可能会造成输入轴旋转非常危险.

8.5 Note :

- 1) Select a Jack with sufficient capacity according to safety factor, service journey and stability. And stationary load, dynamic load and shock load must be lower than permissible maximum load.
- 2) Please note that rotation speed of screw must match load, permissible maximum load, permissible maximum order load, and permissible rotation speed of screw must be verified. If these figures exceed that of products, jacks will be damaged greatly.
- 3) The surface temperature will be limited in $-15^{\circ}\text{C}\sim 80^{\circ}\text{C}$ when jack working to ensure the temperature of traveling nuts in $-15^{\circ}\text{C}\sim 80^{\circ}\text{C}$.
- 4) Maximum input speed is $1500\text{r}/\text{min}$.
- 5) JWM and JWB aren't suitable for continuous operation, jack duty (%ED)
JWM duty (%ED) cannot exceed 20%ED,
JWB duty (%ED) cannot exceed 30%ED.

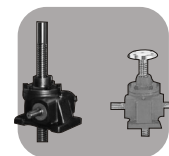
Duty %ED=

$$\frac{\text{Jack operating time (lift \& lower cycle)}}{\text{Elapsed cycle time}} \times 100\%$$

- 6) When several Jacks are connected on the same axial line, the loaded torque with each Jack must be verified and limited within permissible input torque.
- 7) Starting torque must be 200% of service torque.
- 8) At below 0°C ambient temperature, changed adhesion of lubrication will lower jack's efficiency so that sufficient drive is necessary.
- 9) JWM has self-lock function, but an Extra braking device or drive source with braking device is necessary to be equipped because self-lock will be of mal-function when Jack is loaded a heavy shock.
JWB has no self-lock function, to avoid backspin of screw under axial load and its weight, a braking device or drive source with braking device is necessary to be equipped and braking torque must be large than operating torque of Jack.

10) Jack's operating conditions

- 11) When working in dusty space, Jack must be equipped with elastic dust-hood on screw; in open air, shield must be equipped to prevent exposure to wind and rain.
- 12) When working, jack cannot be forced to stop, or it will be damaged seriously.
- 13) Under load, don't change motor drive mode into manual drive, or which will cause backspin of screw and cause great danger.



8. 6选型方法

8. 6. 1升降机型号确定:

8. 6. 1. 1计算总机的当量载荷 W_s (N)

$W_s = \text{最大载荷 } W_{\max} \times \text{使用系数 } f_1$ (N)

被驱动设备系数 (f_1) 表:

载荷性质 Load character	使用举例 Example	被驱动设备系数 Factor for driven machine (f_1)
无冲击载荷, 负荷惯性小 shockless shock & small inertia load	开关、阀门传送带切换装置 Switch, valve transmission belt swithing device	1.0~1.3
轻微冲击载荷, 负荷惯性中等 moderate shock & moderate inertia	各种移动装置;升降用各种升降机 All kinds of moving devices, all kinds of elevators	1.3~1.5
大冲击振动载荷, 负荷惯性大 heavy shock & large inertia	用台车搬运东西;保持压延滚轮的位置 Carrying something by trolley; to keep the position of idling gear	1.5~3.0

8. 6. 1. 2计算单台升降机的当量载荷 W

$$W = \frac{W_s}{\text{连动台数} \times \text{连动系数 } f_d}$$

8. 6. 1. 2Calculate equivalent load of single Jack,

$$W = \frac{W_s}{\text{Number} \times \text{Linkage factor } f_d}$$

连动系数 Linkage factor (f_d)

连动台数 Number of linkage jack	1	2	3	4	5~8
连动台数 Linkage factor	1	0.95	0.9	0.85	0.8

8. 6. 1. 3 确定升降机型号

充分考虑载重、速度、行程、效率、驱动源后暂时选定型号

8. 5. 1. 4 根据使用行程、环境条件、输出顶端的连接方式, 确定升降机的整体型号。

8. 6. 1. 3 Temporarily determine Jack Type:

Temporarily determine Jack type after taking full consideration of load, speed, journey, efficiency and drive source.

8. 5. 1. 4 Determine JW type according to service journey, ambient conditions, connection mode of end-fittings.

8. 6. 2 输入功率校核:

负荷所需输入功率与容许最大输入功率相比较, 如果超过请提高型号或降低丝杆轴转速再计算。

8. 6. 2 Verify input power

If required input power under load exceeds permissible maximum input power, please select large type or lower the speed of screw rotation.

负载所需输入功率计算 Calculation of required input power under load:

所需输入轴转速 Required rotation speed of input shaft	n_1 (r/min)	$n_1 = \frac{V}{L_1} \times i$
所需输入轴扭矩 Required torque of input shaft	T_1 (N · m)	$n_1 = \frac{W \times L_1}{2\pi \times i \times \eta} + T_0$
所需输入功率 Required input power	P_1 (kW)	$P_1 = \frac{T_1 \times n_1}{9550}$

V:升降机丝杆轴(活动螺母)升降速度mm/min L1:丝杆螺距(mm)
i:减速比 W:单台升降机当量载荷(N) π :圆周率
 η :升降机的综合效率 T_0 :空载扭矩(N · m)
(L_1 、 i 、 η 、 T)

V:linear speed of screw mm/min L:Pitch of screw (m)
i:ratio W:equivalent load of single jack π :pi
 η :Integrated efficiency T_0 :No-load torque(N · m)
(L_1 、 i 、 η 、 T_0 refer to basic parameter table)

8. 6. 3 丝杆稳定性校核

当丝杆承受轴向压缩载荷时, 请对其进行稳定性校核, 如超过其临界载荷值请提高型号后再计算。

8. 6. 3 Verify the stability of screw:

Please verify the stability of screw under axial load, larger type should be used when load exceed the critical load.

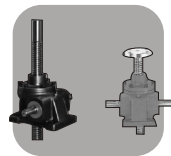
升降机丝杆临界稳定载荷通过以下公式计算:

The formula to calculate the critical the critical load as follows,

$P_{CR} = f_m \times \left(\frac{d^2}{L_a} \right)^2$	确保 ensure	$P_{CR} > W \times SF$ (SF=4)
--	--------------	-------------------------------

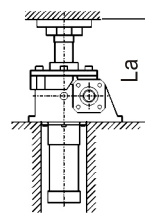
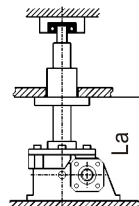
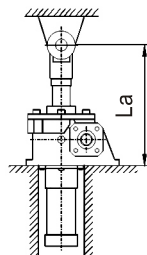
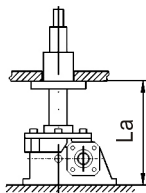
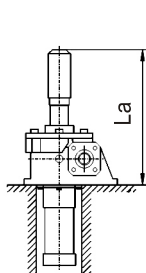
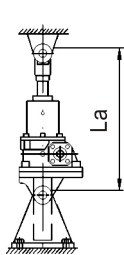
P_{CR} :临界载荷(N) d :丝杆底径mm(参照基本参数表)
 f_m :支撑系数 L_a :作用点间距离, mm
 w :单台升降机当量载荷(N) SF:安全系数(一般SF=4)

P_{CR} :Critical load(N)
 d :small diameter of screw end (mm) (refer to basic parameter table)
 f_m :support factor
 L_a :distance between load-supporting point and moun ting as drawing.
W:equivalent load of single Jack (N) SF:safety factor (SF=4 as usual)



丝杆轴稳定性校核时, L_a (L_a 值计算根据各型号尺寸) 与 f_m (支撑系数) 选择如下:

Verifying the stability of screw, the values of L_a and f_m as follows,



两段支撑 $f_m=10 \times 10^4$
support at both ends $f_m=10 \times 10^4$

底座固定轴自由 $f_m=2.5 \times 10^4$
Foot-mounted & movable shaft end $f_m=2.5 \times 10^4$

底座固定轴端支撑或固定 $f_m=20 \times 10^4$
Foot-mounted & shaft end supporting or fixed $f_m=20 \times 10^4$

8.6.4 临界转速校核

如为活动螺母选型时, 请务必将丝杆轴转速控制在临界转速以下, 若超过临界转速, 请提高型号在计算。

8.6.4 Verifying critical rotation speed:

Using traveling nut, the rotation speed of screw must be lower than critical speed, if no, please select larger type and calculate again.

$$N_c = \frac{96 \times f_n \times d \times 10^6}{L_b^2}$$

$$n_s = \frac{n_1}{i}$$

n_c : 临界转速 r/min

d : 丝杆底径 mm (参照基本参数表)

f_n : 长度系数

L_b : 支撑间距离 mm

n_s : 丝杆转速 r/min

n_1 : 输入转速 r/min

i : 减速比

n_c : Permissible rotation speed of screw

n_s : Rotational speed of screw

d : small diameter of screw (refer to basic parameter table)

n_1 : Rotational speed of input shaft

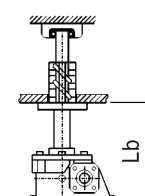
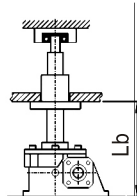
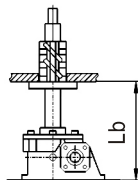
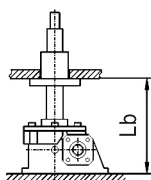
f_n : Length factor

L_b : Distance between both supporting face

i : ratio

丝杆轴转速校核时, L_b (L_b 值计算根据个型号尺寸) 与 f_n (长度系数) 选取如下:

Verifying the rotation speed of screw, the values of L_b and f_n as follows.



轴端自由 $f_n=0.36$
Movable shaft end $f_n=0.36$

轴端支撑 $f_n=1.56$
Shaft end supporting $f_n=1.56$

请确保 $n_c > n_s$

Ensure: $n_c > n_s$

计算举例: JWM200UR-H1200P I 在输入转速为1200r/min, 轴端支撑下运转, 根据外型尺寸与传动能表查得:
 $d=49.3$ $L_b=1437$

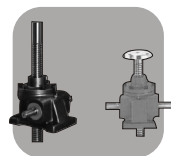
Example for calculation:

Take JWM200UR-H1200P I as example, $n_1=1200$ r/min, connecting mode of top-end: I, we can know $d=49.3$, $L_b=1437$ referring to dimension and transmission capacity table.

$$n_s = \frac{n_1}{i} = \frac{1200}{8} = 1500 \text{ r/min}$$

$$n_c = \frac{96 \times f_n \times d \times 10^6}{L_b^2} = \frac{96 \times 1.56 \times 49.3 \times 10^6}{1437^2} = 3575 \text{ r/min}$$

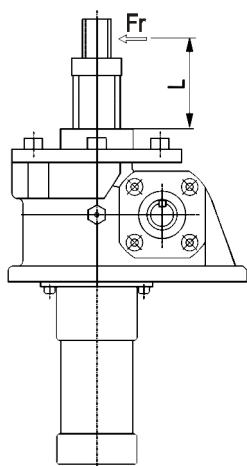
$$N_c = 3575 \text{ r/min} > n_s = 1500 \text{ r/min} \dots \dots \text{ok}$$



8.6.5 当有横向载荷时，请外加导向器。

8.6.5 When there is radial load, please add guiding device.

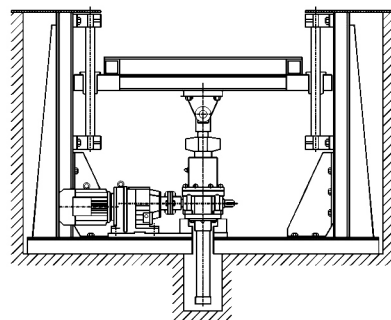
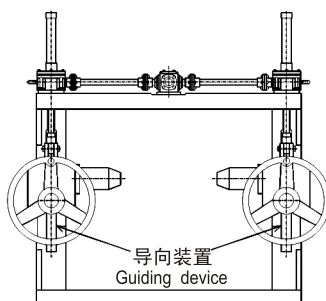
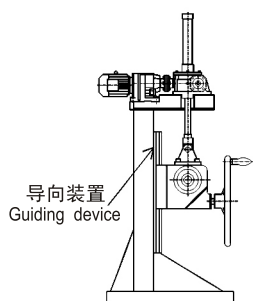
JWM 许用横向载荷 Permitted radial load $Fr(N)$:



Fr(N) Type L(mm)	010	025	050	100	150	200	300	500	750	1000
100	318	570	2500	4010	4610	8210	38200	85300	73500	186200
200	159	290	1250	2010	2300	4110	23000	50400	56800	145000
300	106	190	830	1340	1540	2740	15300	33600	46100	104700
400	79	140	620	1000	1150	2050	11400	25200	39300	78500
500	64	110	500	800	920	1640	9100	20200	33900	62800
600	53	100	420	670	770	1370	7600	16800	29900	52300
700	51	90	360	570	660	1170	6500	14400	26700	44800
800	48	90	310	500	580	1030	5700	12600	24100	39200
900	45	90	280	450	510	910	5000	11200	22000	34800
1000	42	90	250	400	460	820	4500	10100	20200	31300

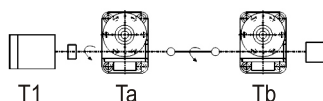
JWB或JWM超过许用横向载荷时,请外加导向装置,举例如下:

When operating radial load exceeds critical radial load, please add guiding device, for example,



8.6.6 当升降机传动配置为串联时(即同一轴线配置了两个或以上数量的长降机)如图,须对各升降机输入轴进行强度校核:

8.6.6 Please verify input torque of each Jack when several Jack are conncted on the same input axial line as the following,



Ta:为升降机a的所需输入扭矩

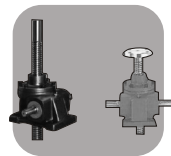
Tb:为升降机b所需的输入扭矩

电机必须的扭矩 $T1 = Ta + Tb < \text{升降机a的容许输入扭矩}$

Ta: Required torque of input shaft of jack a.

Tb: Required torque of input shaft of jack b.

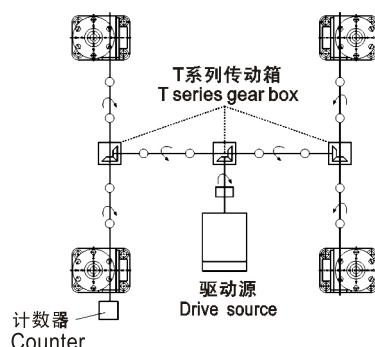
Requered torque of motor $T1 = Ta + Tb < \text{Promitted input torque of jack a.}$



8.7 升降机选型举例:

例:4台连动压上用,结构如下图所示的4台加动模式,工厂内保持常温,有少许灰尘,有横向负荷在升降机侧面设置了导向器,安装状态采用底座固定,轴端采用一固定一支撑,电源为三相380V/50HZ,使用频率为2次/小时×8小时.

1. 最大轴向载荷:88.2KN/4台
2. 升降速度:10mm/s (600mm/min)
3. 使用行程:260mm



升降机型号确定:

- 1>.计算总机当量载荷 W_s (取被驱动设备系数为1.3)
 $W_s = W_{max} \cdot f_1 = 88200 \times 1.3 = 114660N$
- 2>.计算单台当量载荷 W

$$W = \frac{114660}{4 \times 0.85} = 33724N$$

3>.暂定型号:

考虑速度、效率、驱动源、载重后暂定选择JWB050USH (参照基本参数表)

4>.行程校核:

使用行程为260mm,充分考虑余量后选定行程为300mm(参照JWB050US尺寸表)

5>.输入功率校核:

(1)所需输入功率计算:

$$\textcircled{1} n_1 = \frac{V}{L_1} \times i = \frac{0.80}{0.010} \times 6 = 360r/min$$

$$\textcircled{2} T_1 = \frac{W \times L_1}{2\pi \times i \times \eta} + T_0$$

$$= \frac{33724 \times 0.010}{2 \times 3.14 \times 6 \times 0.64} + 1.37 = 15.4Nm$$

$$\textcircled{3} P_1 = \frac{T_1 \times n_1}{9550}$$

$$= \frac{15.4 \times 360}{9550} = 0.58kW$$

(2) 参照基本参数表, $P_{max} = 2.2KW > P_1 \dots \dots OK$

6>.丝杆稳定性校核:

因为施加压缩载荷,根据传动能力表及外形尺寸图得出:

$$D = 31.3 \quad L_a = 604 + 33 = 637 \quad f_m = 20 \times 10^4 \quad SF = 4$$

$$P_{CR} = f_m \times \left(\frac{d^2}{L_a} \right)^2 = 20 \times 10^4 \times \left(\frac{31.3^2}{637} \right) = 473073N$$

$$P_F = \frac{P_{CR}}{SF} = \frac{473073}{4} = 118268 > W = 33724$$

$\dots \dots OK$

8.7 Jack selection example:

Example: Four Jacks, linked as the following drawing, normal temperature, thin dust, radial load, with guiding devices on one side, foot-mounted, fixed the screw top-end, 380v/50HZ, service frequency: 2 times/hour, service time: 8 hours.

1. Maximum axial load; 88.2Kn/4 Jacks
2. Linear speed: 10mm/s (60mm/min)
3. Service journey: 260mm

Determine Jac type,

- 1> Calculate total equivalent load W_s
(Factor for driven machine is 1.3)
 $W_s = W_{max} \cdot f_1 = 88200 \times 1.3 = 114660N$
- 2> Calculate equivalent load of single jack:

3>. Temporarily determine type,

Temporarily determine JWB050USH according to speed, efficiency, drive and Load (refer to basic parameter table)

4>. Verify journey:

Service journey is 260mm, determine journey should be 300 after considering surplus.
(Please refer to dimension sheet of JWB050US)

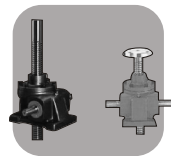
5>. Check inputa power:

(1) Calculate required input power:

(2) Refer to basic parameter table, $P_{max} = 2.2KW > P_1 \dots \dots OK$

6>. Verify the stability of screw

For under axial load, refer to transmission table and dimension for the following figures,



8.8 JWM、JWB系列外形尺寸图表：

8.8 Outline dimension sheet of jack:

JWM010

			US					
			X		X ⁽¹⁾		L	M (Kg)
			MIN	MAX	MIN	MAX		
			100	101	201	161	261	194
200	101	301	161	361	294	5.7		
300	101	401	201	501	434	6.1		
400	101	501	201	601	534	6.3		
500	101	601	236	736	669	6.6		
600	101	701	236	836	769	6.9		
800	101	901	271	1071	1004	7.5		

			DS					
			X		X ⁽¹⁾		L	M (Kg)
			MIN	MAX	MIN	MAX		
			100	25	125	75	175	194
200	25	225	75	275	294	5.7		
300	25	325	115	415	434	6.1		
400	25	425	115	515	534	6.3		
500	25	525	150	650	669	6.6		
600	25	625	150	750	769	6.9		
800	25	825	185	985	1004	7.5		

			UM					
			X		X ⁽¹⁾		L	M (Kg)
			MIN	MAX	MIN	MAX		
			100	101	201	161	261	194
200	101	301	161	361	294	7.2		
300	101	401	201	501	434	8.1		
400	101	501	201	601	534	8.8		
500	101	601	236	736	669	9.6		
600	101	701	236	836	769	11		
800	101	901	271	1071	1004	12		

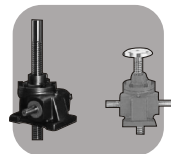
			DM					
			X		X ⁽¹⁾		L	M (Kg)
			MIN	MAX	MIN	MAX		
			100	25	125	75	175	194
200	25	225	75	275	294	7.2		
300	25	325	115	415	434	8.1		
400	25	425	115	515	534	8.8		
500	25	525	150	650	669	9.6		
600	25	625	150	750	769	11		
800	25	825	185	985	1004	12		

			UR				
			X		Y	m (Kg)	
			MIN	MAX			
			100	108	208	246	346
200	108	308	246	446	6.1		
300	108	408	246	546	6.2		
400	108	508	246	646	6.4		
500	108	608	246	746	6.6		
600	108	708	246	846	6.8		
800	108	808	246	946	7.2		

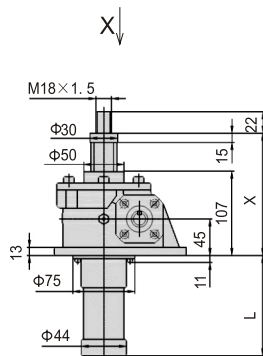
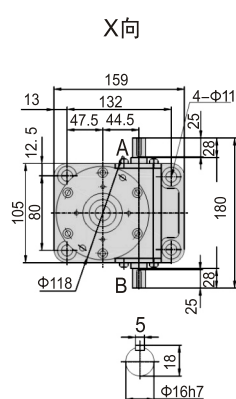
			DR				
			X		Y	m (Kg)	
			MIN	MAX			
			100	50	150	160	260
200	50	250	160	360	6.1		
300	50	350	160	460	6.2		
400	50	450	160	560	6.4		
500	50	550	160	660	6.6		
600	50	650	160	760	6.8		
800	50	850	160	860	7.2		

注:X⁽¹⁾为加防尘罩时尺寸。

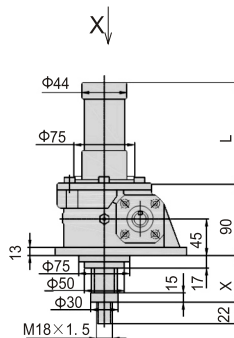
Note:X⁽¹⁾is the dimension of jack with dust hood.



JWM025



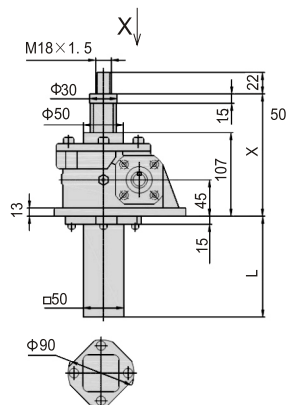
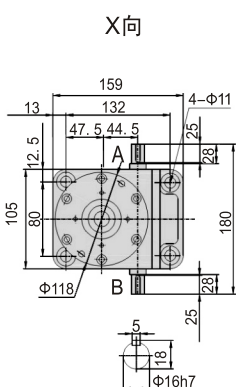
JWM025US



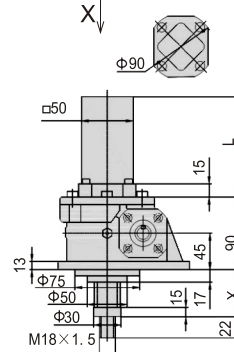
JWM025DS

行程 (mm) Journey	US				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	132	232	147	247	149
200	132	332	147	347	249
300	132	432	167	467	369
400	132	532	167	567	469
500	132	632	187	687	589
600	132	732	187	787	689
800	132	932	207	1007	909
1000	132	1132	227	1227	1129

行程 (mm) Journey	DS				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	57	157	149
200	42	242	57	257	249
300	42	342	77	377	369
400	42	442	77	477	469
500	42	542	97	597	589
600	42	642	97	697	689
800	42	842	117	917	909
1000	42	1042	137	1137	1129



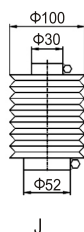
JWM025UM



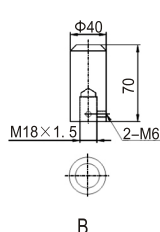
JWM025DM

行程 (mm) Journey	UM				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	132	232	147	247	175
200	132	332	147	347	275
300	132	432	167	467	395
400	132	532	167	567	495
500	132	632	187	687	615
600	132	732	187	787	715
800	132	932	207	1007	935
1000	132	1132	227	1227	1155

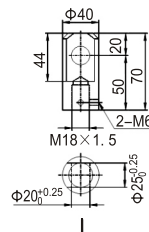
行程 (mm) Journey	DM				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	57	157	175
200	42	242	57	257	275
300	42	342	77	377	395
400	42	442	77	477	495
500	42	542	97	597	615
600	42	642	97	697	715
800	42	842	117	917	935
1000	42	1042	137	1137	1155



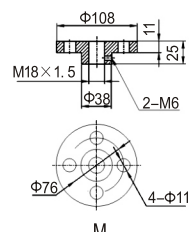
J



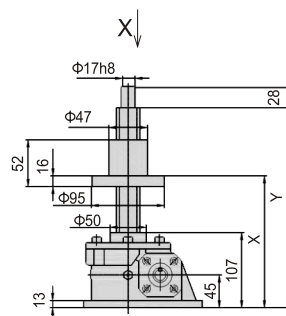
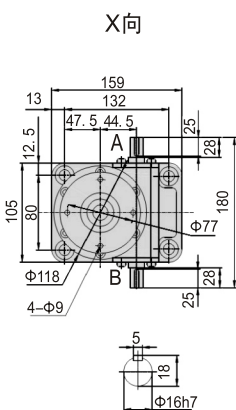
B



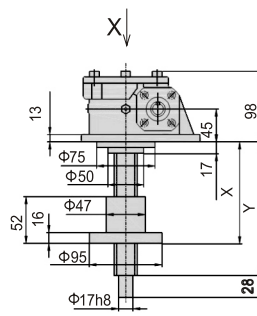
I



M



JWM025UR



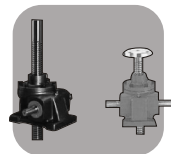
JWM025DR

行程 (mm) Journey	UR			
	X		Y	m (Kg)
	MIN	MAX		
100	133	233	279	9.2
200	133	333	379	9.5
300	133	433	479	9.9
400	133	533	579	11
500	133	633	679	11
600	133	733	779	11
800	133	933	979	12
1000	133	1133	1179	13

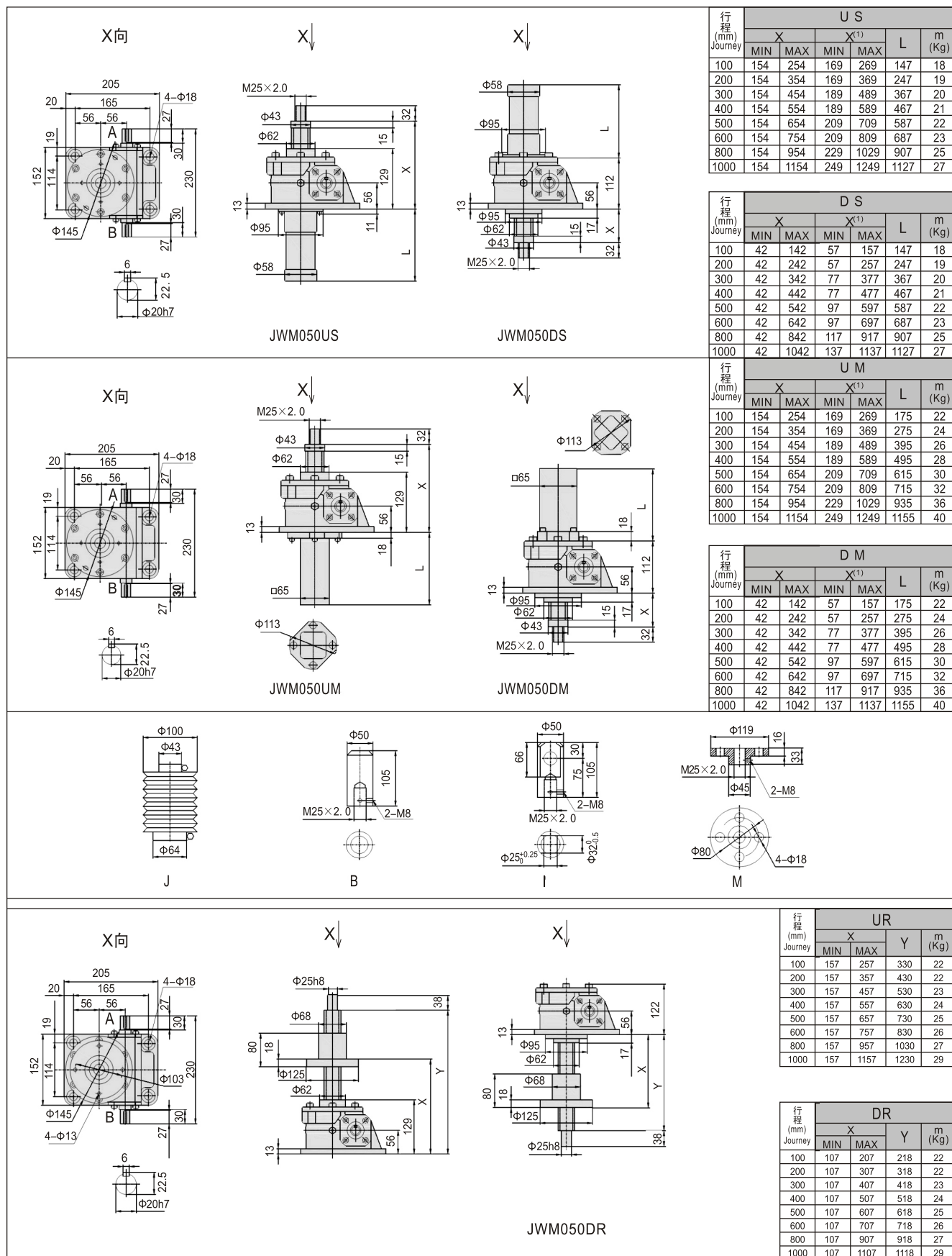
行程 (mm) Journey	DR			
	X		Y	m (Kg)
	MIN	MAX		
100	79	179	189	9.2
200	79	279	289	9.5
300	79	379	389	9.9
400	79	479	489	11
500	79	579	589	11
600	79	679	689	11
800	79	879	889	12
1000	79	1079	1089	13

注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.

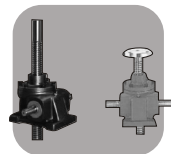


JWM050

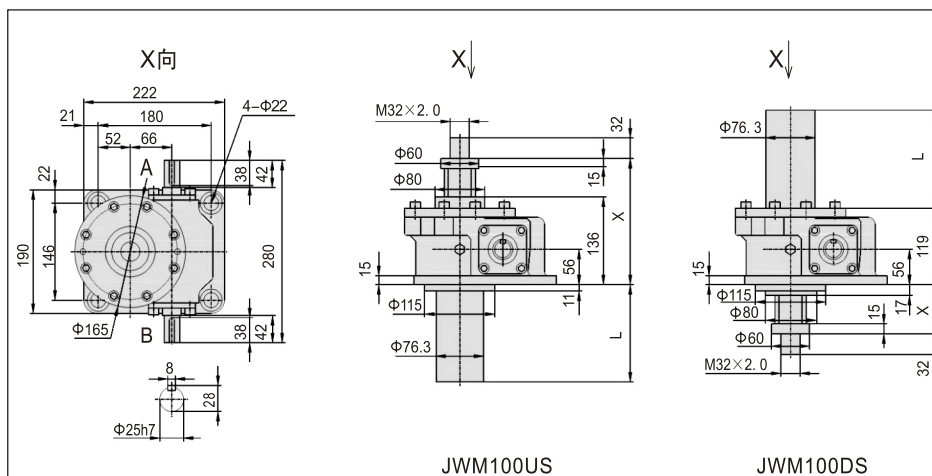


注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.

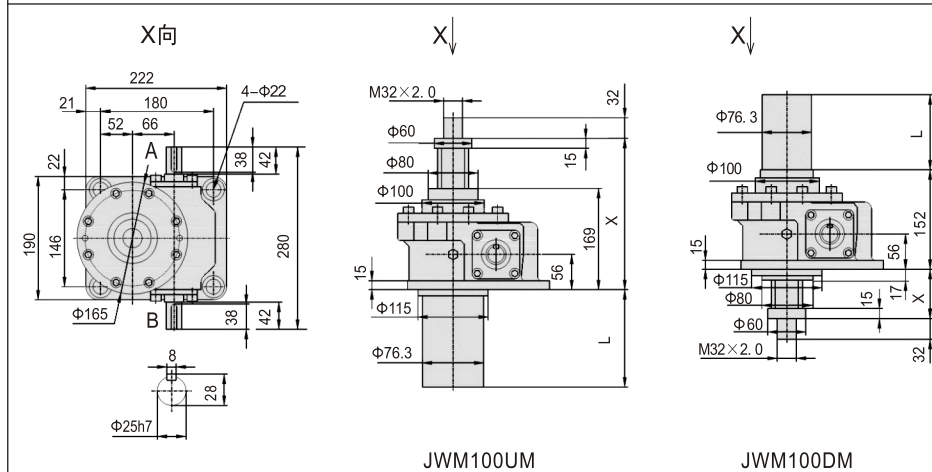


JWM100



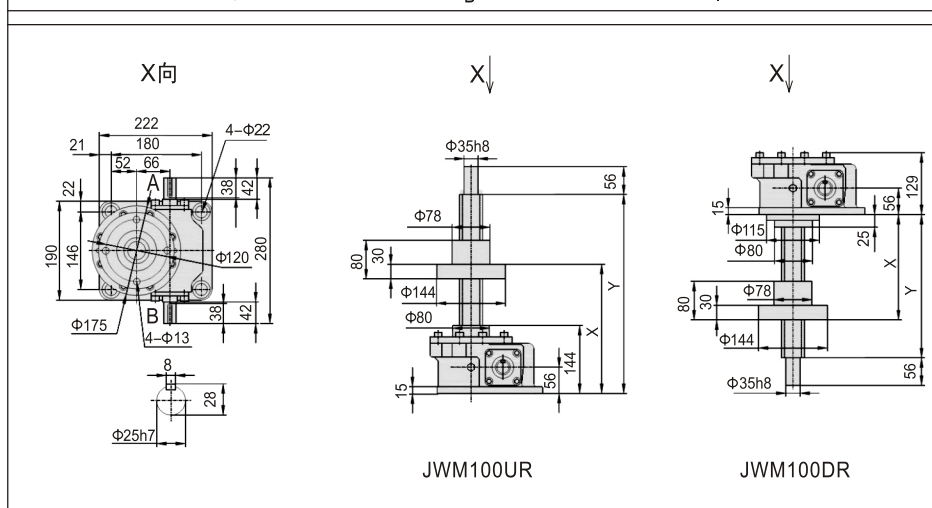
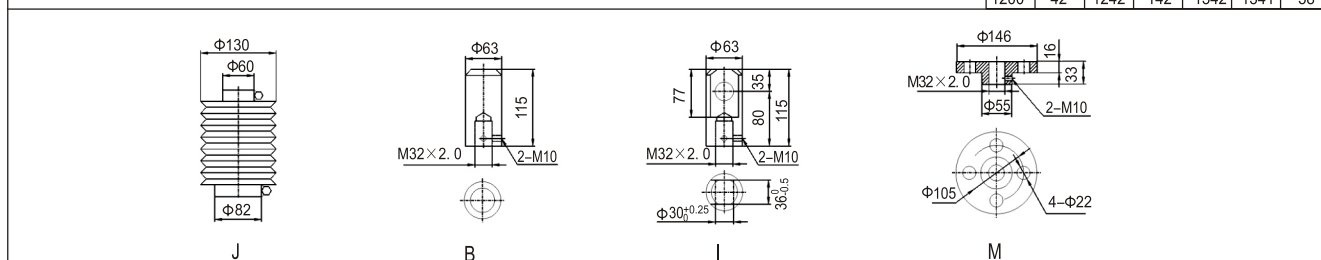
行程 (mm) Journey	U S				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	161	261	171	271	151
200	161	361	171	371	252
300	161	461	186	486	366
400	161	561	186	586	466
500	161	661	211	711	591
600	161	761	211	811	691
800	161	961	226	1026	906
1000	161	1161	236	1236	1116
1200	161	1361	261	1461	1341

行程 (mm) Journey	D S				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	52	152	151
200	42	242	52	252	252
300	42	342	67	367	366
400	42	442	67	467	466
500	42	542	92	592	591
600	42	642	92	692	691
800	42	842	107	907	906
1000	42	1042	117	1117	1116
1200	42	1242	142	1342	1341



行程 (mm) Journey	U M				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	194	294	204	304	151
200	194	394	204	404	252
300	194	494	219	519	366
400	194	594	219	619	466
500	194	694	244	744	591
600	194	794	244	844	691
800	194	994	259	1059	906
1000	194	1194	269	1269	1116
1200	194	1394	294	1494	1341

行程 (mm) Journey	D M				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	52	152	151
200	42	242	52	252	252
300	42	342	67	367	366
400	42	442	67	467	466
500	42	542	92	592	591
600	42	642	92	692	691
800	42	842	107	907	906
1000	42	1042	117	1117	1116
1200	42	1242	142	1342	1341

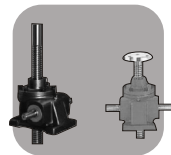


行程 (mm) Journey	UR			
	X		Y	m (Kg)
	MIN	MAX		
100	184	284	344	32
200	184	384	444	33
300	184	484	544	34
400	184	584	644	36
500	184	684	744	37
600	184	784	844	38
800	184	984	1044	41
1000	184	1184	1244	43
1200	184	1384	1444	45

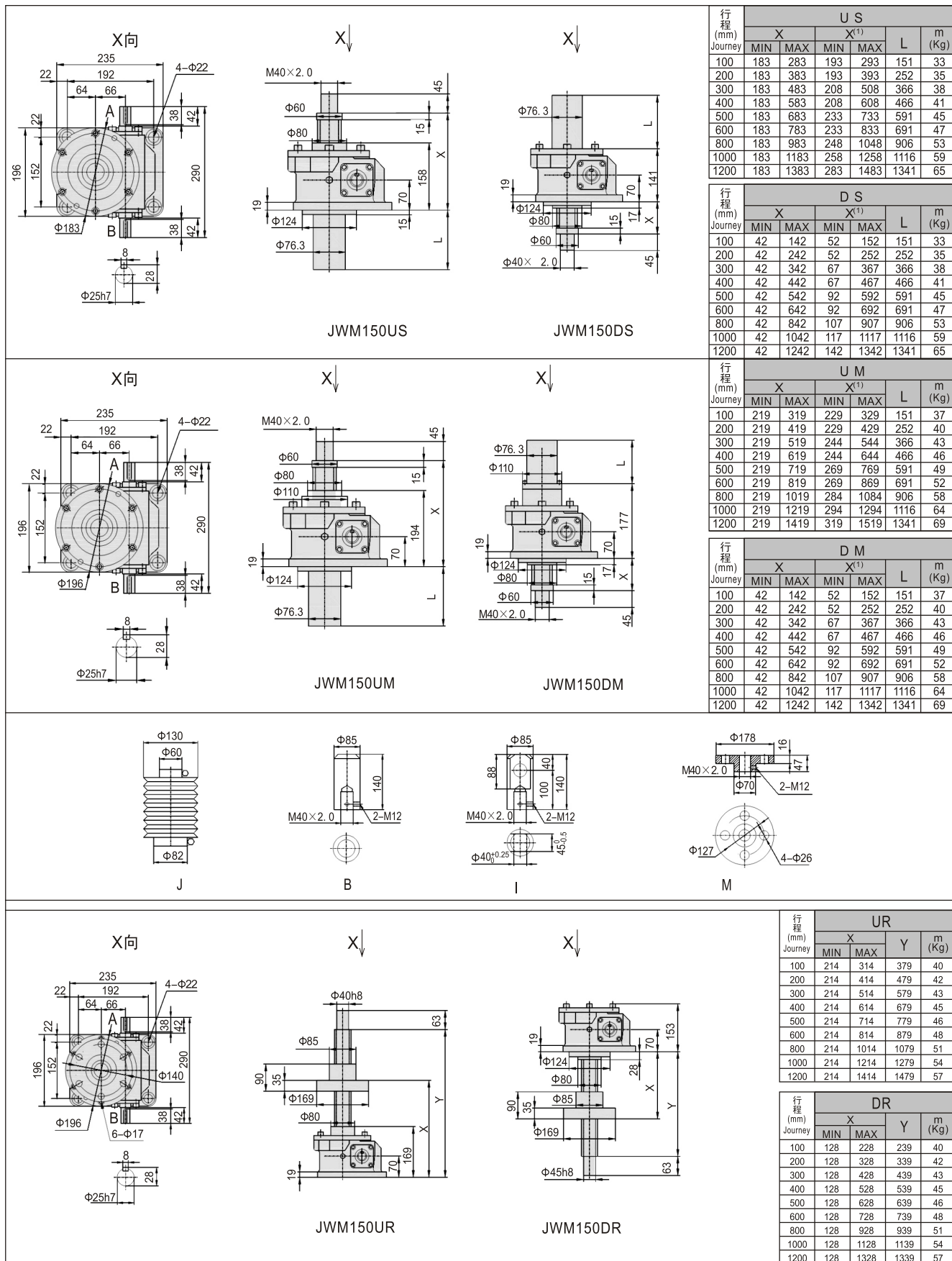
行程 (mm) Journey	DR			
	X		Y	m (Kg)
	MIN	MAX		
100	115	215	225	32
200	115	315	325	33
300	115	415	425	34
400	115	515	525	36
500	115	615	625	37
600	115	715	725	38
800	115	915	925	41
1000	115	1115	1125	43
1200	115	1315	1325	45

注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.



JWM150



行程 (mm) Journey	U S				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	183	283	193	293	151
200	183	383	193	393	252
300	183	483	208	508	366
400	183	583	208	608	466
500	183	683	233	733	591
600	183	783	233	833	691
800	183	983	248	1048	906
1000	183	1183	258	1258	1116
1200	183	1383	283	1483	1341

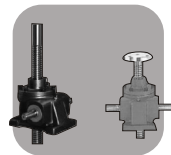
行程 (mm) Journey	D S				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	52	152	151
200	42	242	52	252	252
300	42	342	67	367	366
400	42	442	67	467	466
500	42	542	92	592	591
600	42	642	92	692	691
800	42	842	107	907	906
1000	42	1042	117	1117	1116
1200	42	1242	142	1342	1341

行程 (mm) Journey	U M				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	219	319	229	329	151
200	219	419	229	429	252
300	219	519	244	544	366
400	219	619	244	644	466
500	219	719	269	769	591
600	219	819	269	869	691
800	219	1019	284	1084	906
1000	219	1219	294	1294	1116
1200	219	1419	319	1519	1341

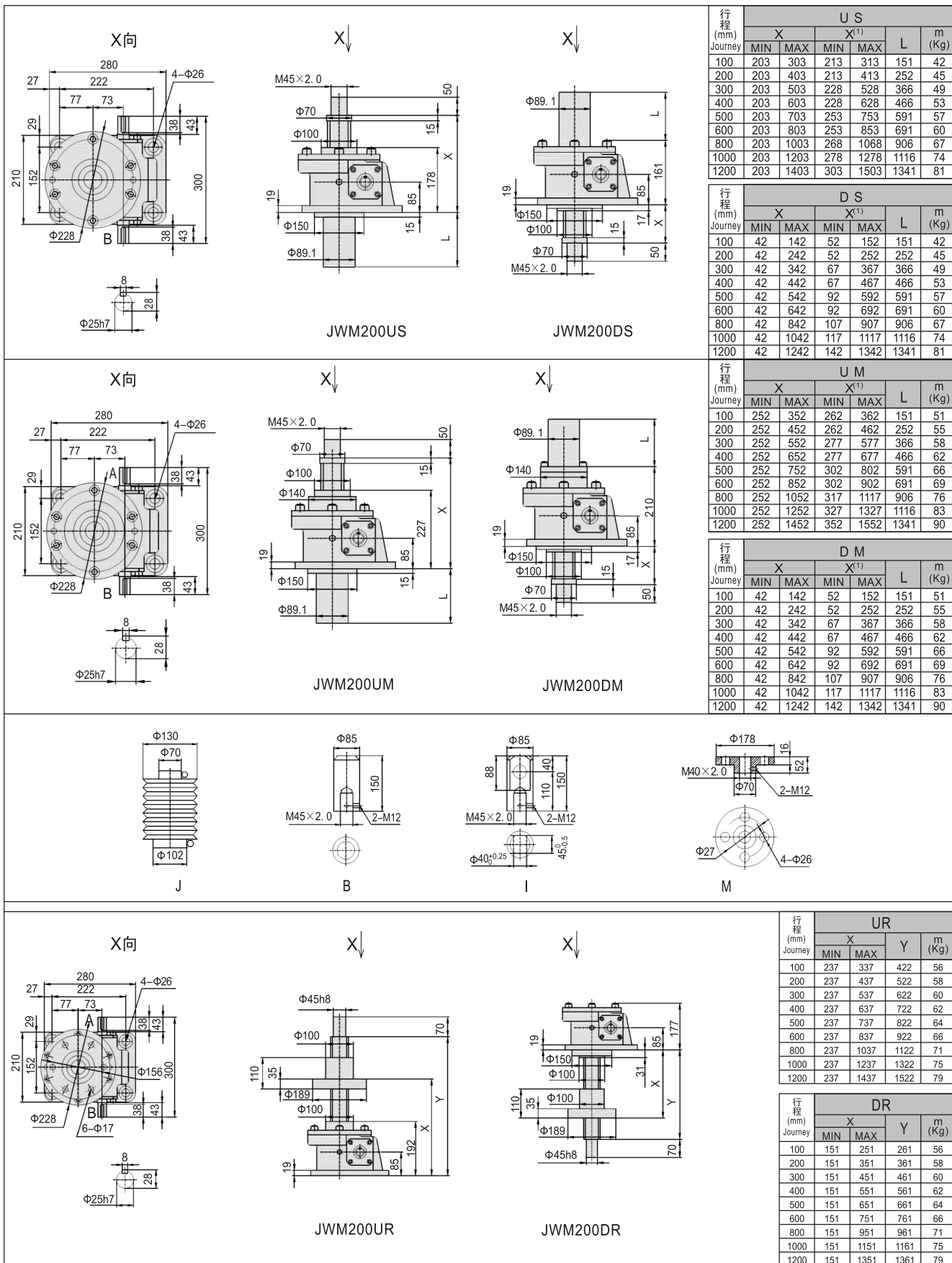
行程 (mm) Journey	D M				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	52	152	151
200	42	242	52	252	252
300	42	342	67	367	366
400	42	442	67	467	466
500	42	542	92	592	591
600	42	642	92	692	691
800	42	842	107	907	906
1000	42	1042	117	1117	1116
1200	42	1242	142	1342	1341

注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.



JWM200



行程 (mm) Journey	U S				L	m (Kg)
	X		X ⁽¹⁾			
100	203	303	213	313	151	42
200	203	403	213	413	252	45
300	203	503	228	528	366	49
400	203	603	228	628	466	53
500	203	703	253	753	591	57
600	203	803	253	853	691	60
800	203	1003	268	1068	906	67
1000	203	1203	278	1278	1116	74
1200	203	1403	303	1503	1341	81

行程 (mm) Journey	D S				L	m (Kg)
	X		X ⁽¹⁾			
100	42	142	52	152	151	42
200	42	242	52	252	252	45
300	42	342	67	367	366	49
400	42	442	67	467	466	53
500	42	542	92	592	591	57
600	42	642	92	692	691	60
800	42	842	107	907	906	67
1000	42	1042	117	1117	1116	74
1200	42	1242	142	1342	1341	81

行程 (mm) Journey	U M				L	m (Kg)
	X		X ⁽¹⁾			
100	252	352	262	362	151	51
200	252	452	262	462	252	55
300	252	552	277	577	366	58
400	252	652	277	677	466	62
500	252	752	302	802	591	66
600	252	852	302	902	691	69
800	252	1052	317	1117	906	76
1000	252	1252	327	1327	1116	83
1200	252	1452	352	1552	1341	90

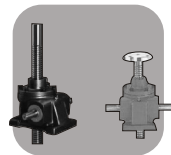
行程 (mm) Journey	D M				L	m (Kg)
	X		X ⁽¹⁾			
100	42	142	52	152	151	51
200	42	242	52	252	252	55
300	42	342	67	367	366	58
400	42	442	67	467	466	62
500	42	542	92	592	591	66
600	42	642	92	692	691	69
800	42	842	107	907	906	76
1000	42	1042	117	1117	1116	83
1200	42	1242	142	1342	1341	90

行程 (mm) Journey	UR			m (Kg)
	X		Y	
100	237	337	422	56
200	237	437	522	58
300	237	537	622	60
400	237	637	722	62
500	237	737	822	64
600	237	837	922	66
800	237	1037	1122	71
1000	237	1237	1322	75
1200	237	1437	1522	79

行程 (mm) Journey	DR			m (Kg)
	X		Y	
100	151	251	261	56
200	151	351	361	58
300	151	451	461	60
400	151	551	561	62
500	151	651	661	64
600	151	751	761	66
800	151	951	961	71
1000	151	1151	1161	75
1200	151	1351	1361	79

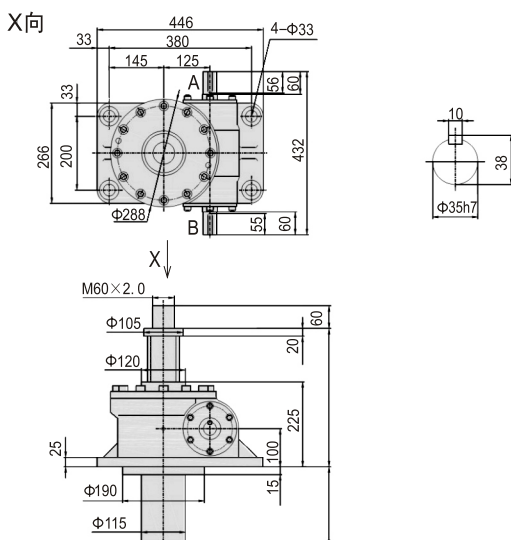
注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.

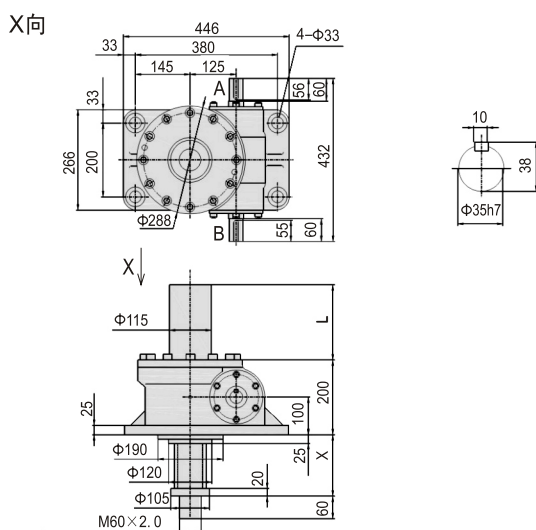


JWM300

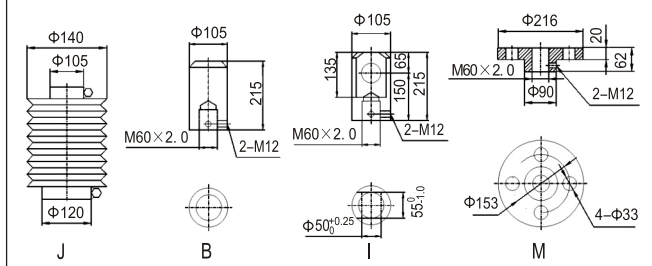
行程 (mm) Journey	US					DS					m (Kg)
	X		X ⁽¹⁾		L	X		X ⁽¹⁾		L	
100	255	355	265	365	160	55	155	65	165	160	118
200	255	455	265	465	260	55	255	65	265	260	123
300	255	555	280	580	375	55	355	80	380	375	128
400	255	655	280	680	475	55	455	80	480	475	134
500	255	755	295	795	590	55	555	95	595	590	139
600	255	855	295	895	690	55	655	95	695	690	145
800	255	1055	310	1110	905	55	855	110	910	905	155
1000	255	1255	330	1330	1125	55	1055	130	1130	1125	167
1200	255	1455	340	1540	1335	55	1255	140	1340	1335	177
1500	255	1755	365	1865	1660	55	1555	165	1665	1660	194



JWM300US

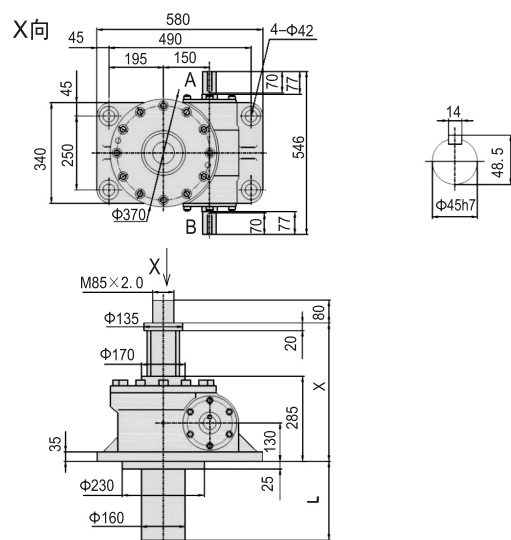


JWM300DS

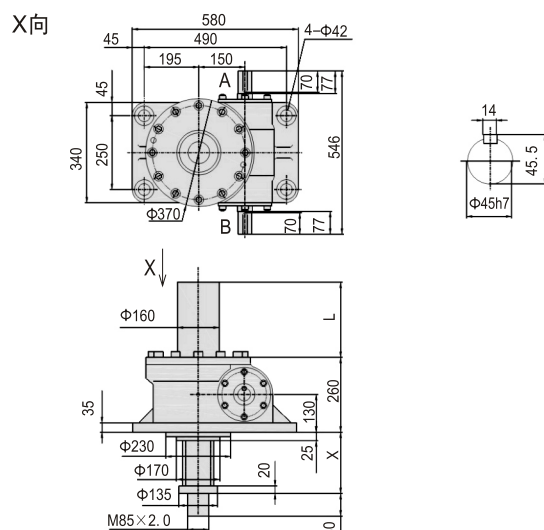


JWM500

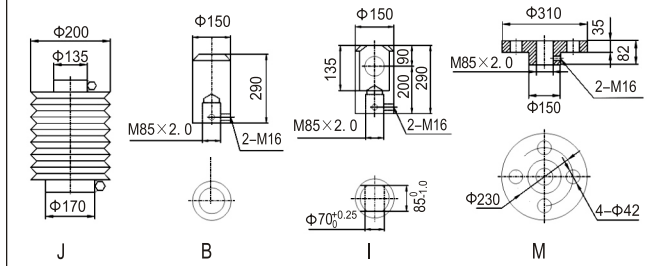
行程 (mm) Journey	US					DS					m (Kg)
	X		X ⁽¹⁾		L	X		X ⁽¹⁾		L	
100	315	415	320	420	165	55	155	60	160	165	248
200	315	515	320	520	265	55	255	60	260	265	260
300	315	615	340	640	385	55	355	80	380	385	273
400	315	715	340	740	485	55	455	80	480	485	284
500	315	815	350	850	395	55	555	90	590	395	279
600	315	915	350	950	695	55	655	90	690	695	308
800	315	1115	365	1165	910	55	855	105	905	910	332
1000	315	1315	380	1380	1125	55	1055	120	1120	1125	357
1200	315	1515	390	1590	1335	55	1255	130	1330	1335	380
1500	315	1815	410	1910	1665	55	1555	150	1650	1665	417
2000	315	2315	445	2445	2190	55	2055	185	2185	2190	477



JWM500US

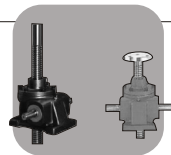


JWM500DS

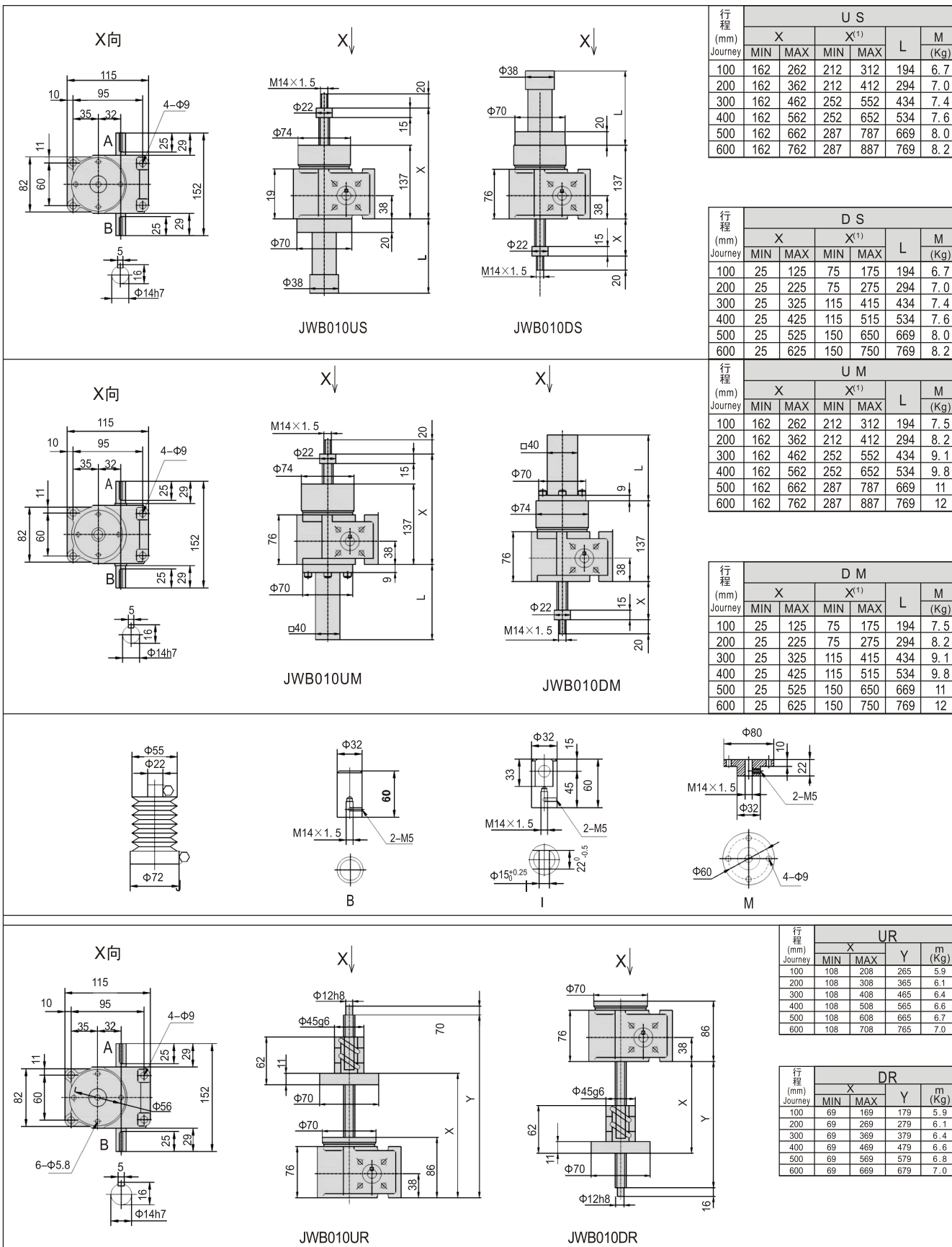


注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.

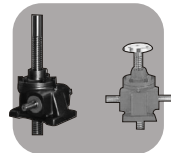


JWB010

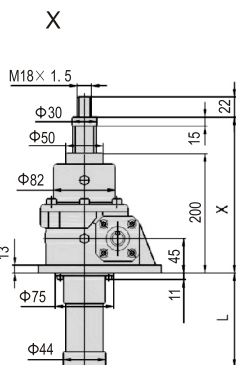
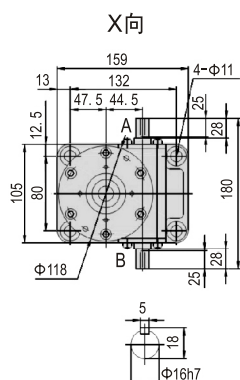


注:X⁽¹⁾为加防尘罩时尺寸。

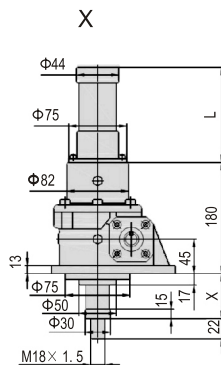
Note:X⁽¹⁾ is the dimension of jack with dust hood.



JWB025



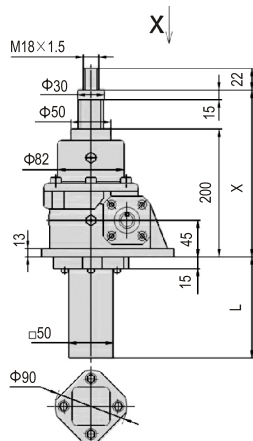
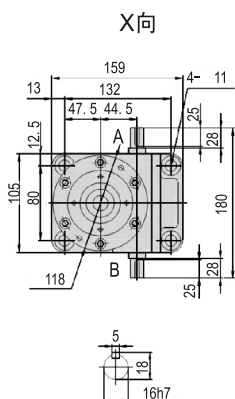
JWB025US



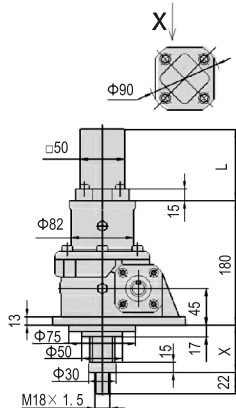
JWB025DS

行程 (mm) Journey	US				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	225	325	240	340	149
200	225	425	240	440	249
300	225	525	260	560	369
400	225	625	260	660	469
500	225	725	280	780	589
600	225	825	280	880	689
800	225	1025	300	1100	909

行程 (mm) Journey	DS				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	57	157	156
200	42	242	57	257	256
300	42	342	77	377	376
400	42	442	77	477	476
500	42	542	97	597	596
600	42	642	97	697	696
800	42	842	117	917	916



JWB025UM



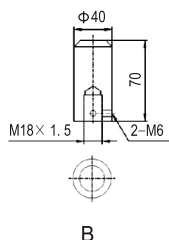
JWB025DM

行程 (mm) Journey	UM				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	225	325	240	340	175
200	225	425	240	440	275
300	225	525	260	560	395
400	225	625	260	660	495
500	225	725	280	780	615
600	225	825	280	880	715
800	225	1025	300	1100	935

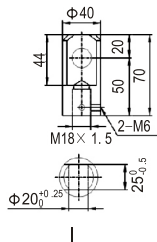
行程 (mm) Journey	DM				
	X		X ⁽¹⁾		L
	MIN	MAX	MIN	MAX	
100	42	142	57	157	182
200	42	242	57	257	282
300	42	342	77	377	402
400	42	442	77	477	502
500	42	542	97	597	622
600	42	642	97	697	722
800	42	842	117	917	942



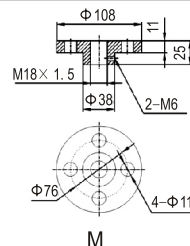
J



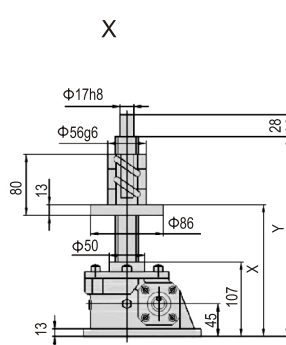
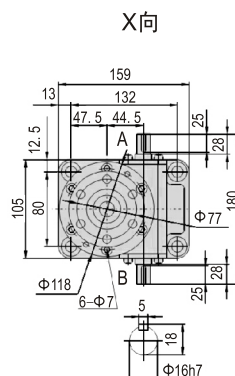
B



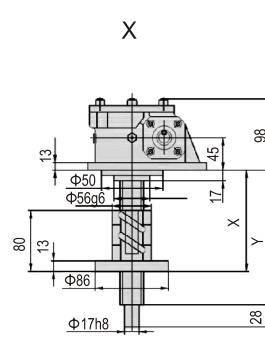
I



M



JWB025UR



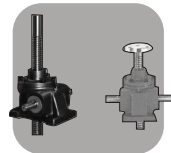
JWB025DR

行程 (mm) Journey	UR			
	X		Y	m (Kg)
	MIN	MAX		
100	133	233	309	9.2
200	133	333	409	9.5
300	133	433	509	9.9
400	133	533	609	11
500	133	633	709	11
600	133	733	809	11
800	133	933	1009	12

行程 (mm) Journey	DR			
	X		Y	m (Kg)
	MIN	MAX		
100	103	208	219	9.2
200	103	308	319	9.5
300	103	408	419	9.9
400	103	508	419	11
500	103	608	619	11
600	103	708	719	11
800	103	908	919	12

注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.



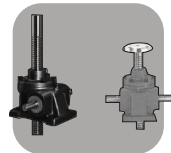
JWB050

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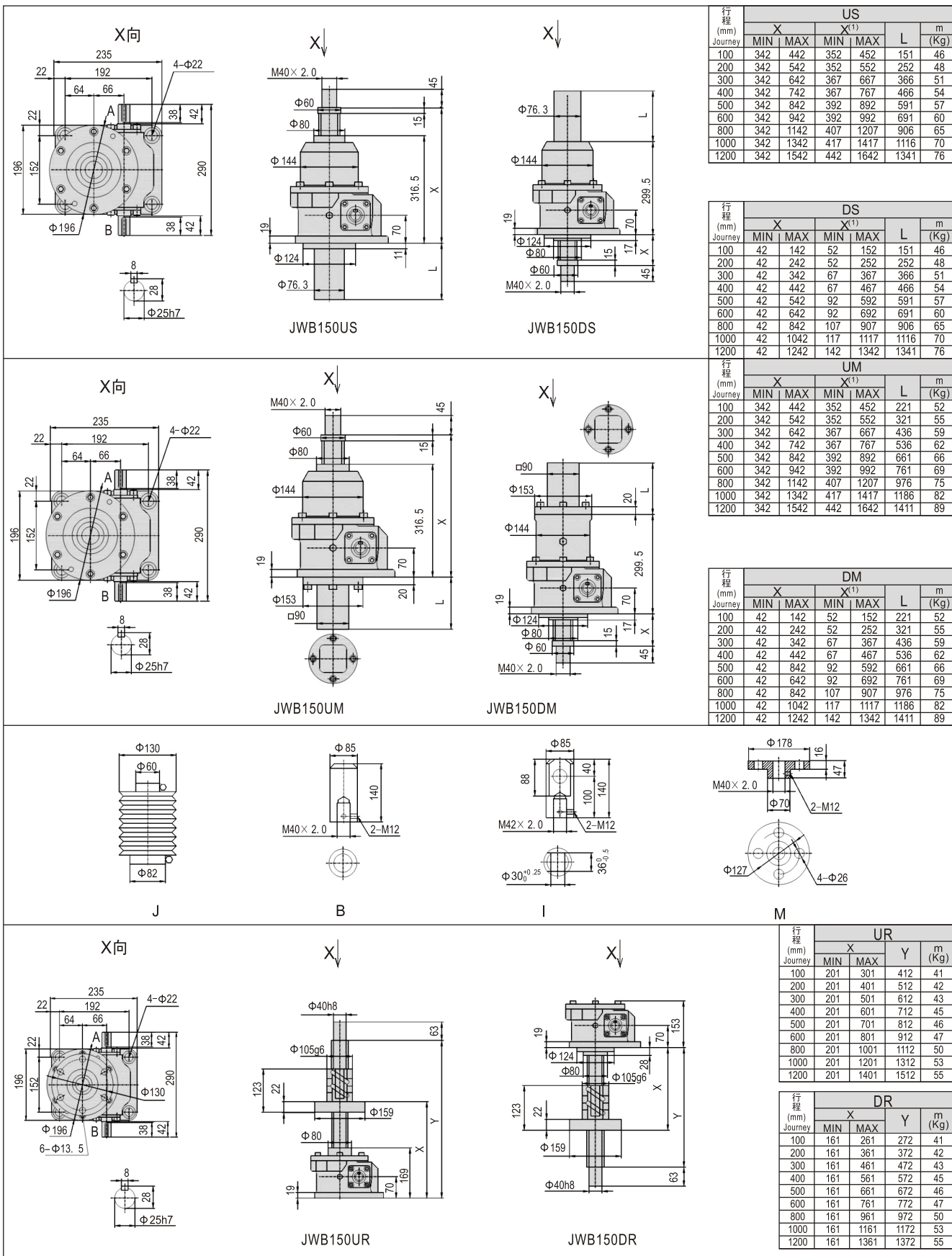
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注:X⁽¹⁾为加防尘罩时尺寸。

Note:X⁽¹⁾ is the dimension of jack with dust hood.

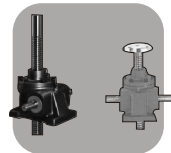


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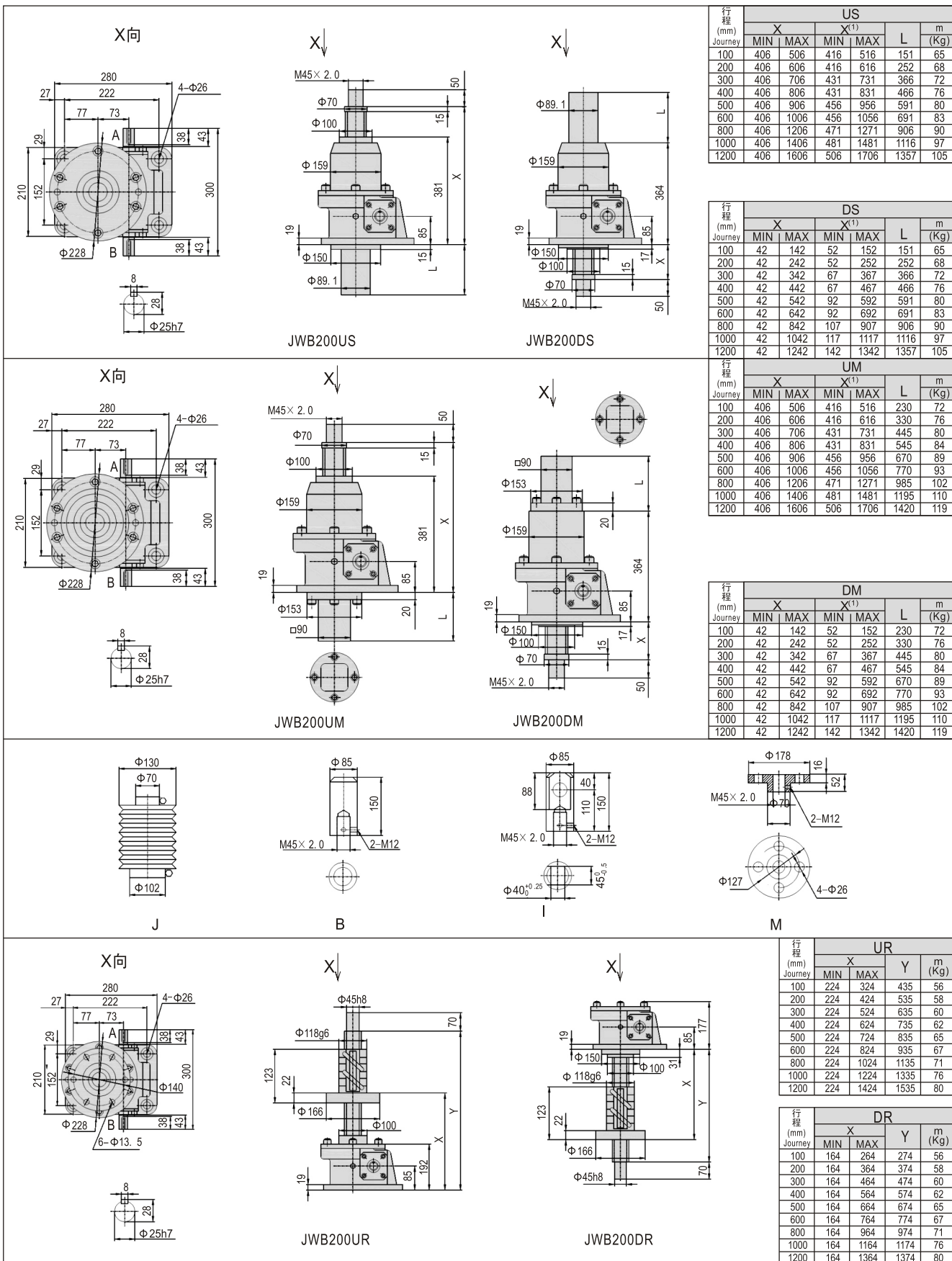


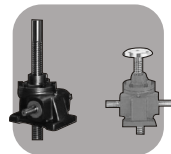
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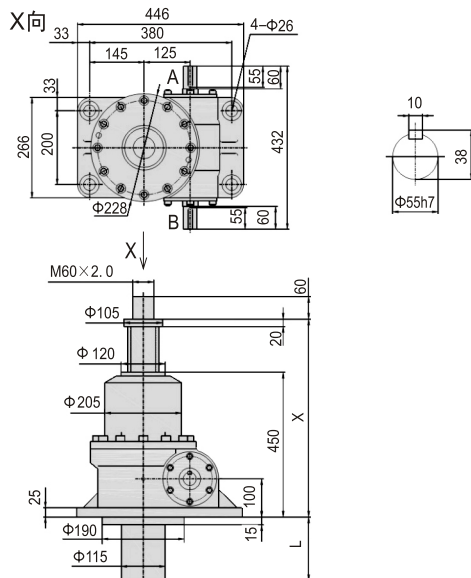
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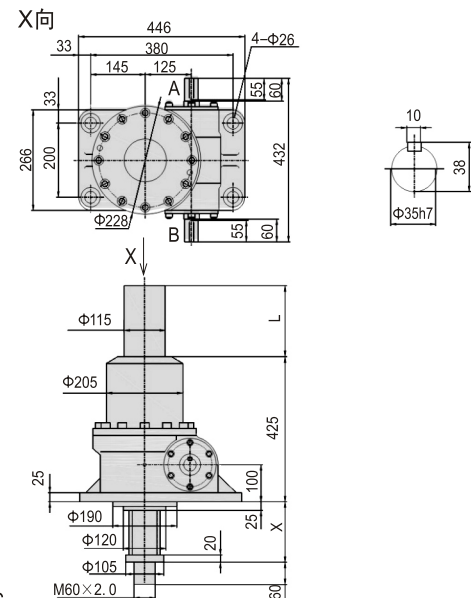


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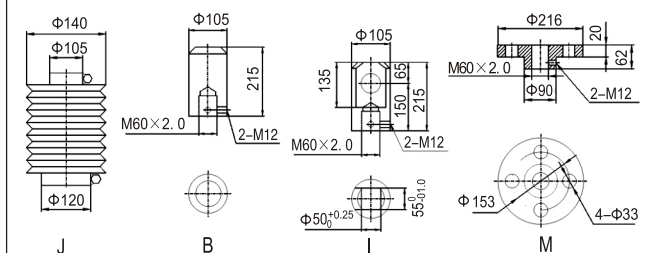
行程 (mm) Journey	US				L	DS				m (Kg)	
	X		X ⁽¹⁾			X		X ⁽¹⁾			
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	480	580	490	590	160	55	155	65	165	160	153
200	480	680	490	690	260	55	255	65	265	260	159
300	480	780	505	805	375	55	355	80	380	375	166
400	480	880	505	905	475	55	455	80	480	475	172
500	480	980	520	1020	590	55	555	95	595	590	178
600	480	1080	520	1120	690	55	655	95	695	690	184
800	480	1280	535	1335	905	55	855	110	910	905	197
1000	480	1480	555	1555	1125	55	1055	130	1130	1125	210
1200	480	1680	565	1765	1335	55	1255	140	1340	1335	223
1500	480	1980	590	2090	1660	55	1555	165	1665	1660	242



JWB300US



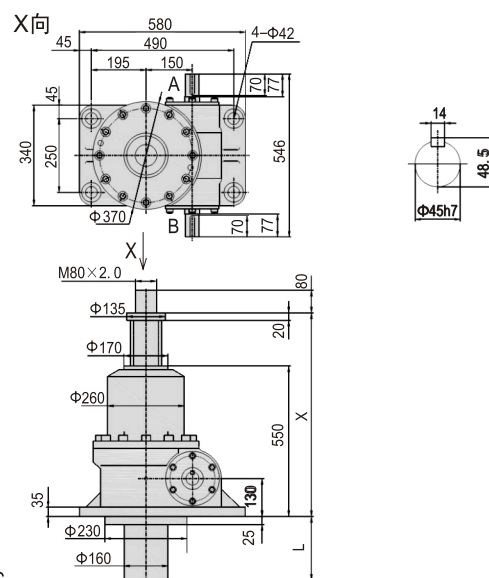
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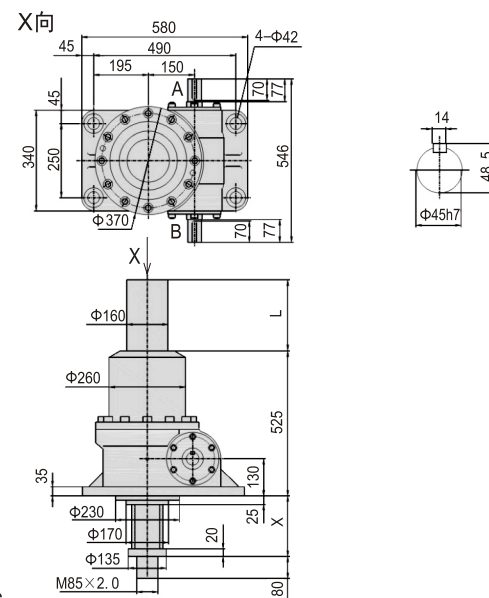
注:X⁽¹⁾为加防尘罩时尺寸。

JWM500

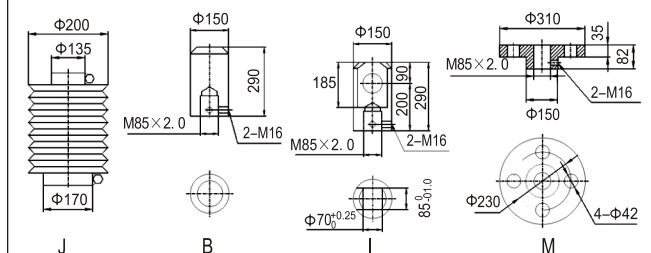
行程 (mm) Journey	US				L	DS				m (Kg)	
	X		X ⁽¹⁾			X		X ⁽¹⁾			
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	580	680	585	685	165	55	155	60	165	165	310
200	580	780	585	785	265	55	255	60	265	265	320
300	580	880	605	905	385	55	355	80	380	385	330
400	580	980	605	1005	485	55	455	80	480	485	340
500	580	1080	615	1115	595	55	555	90	595	595	350
600	580	1180	615	1215	695	55	655	90	695	695	359
800	580	1380	630	1430	910	55	855	105	910	910	378
1000	580	1580	645	1645	1125	55	1055	120	1130	1125	398
1200	580	1780	655	1855	1335	55	1255	130	1340	1335	417
1500	580	2080	675	2175	1665	55	1555	150	1665	1665	446



JWB500US



JWB500DS



Note:X⁽¹⁾ is the dimension of jack with dust hood.