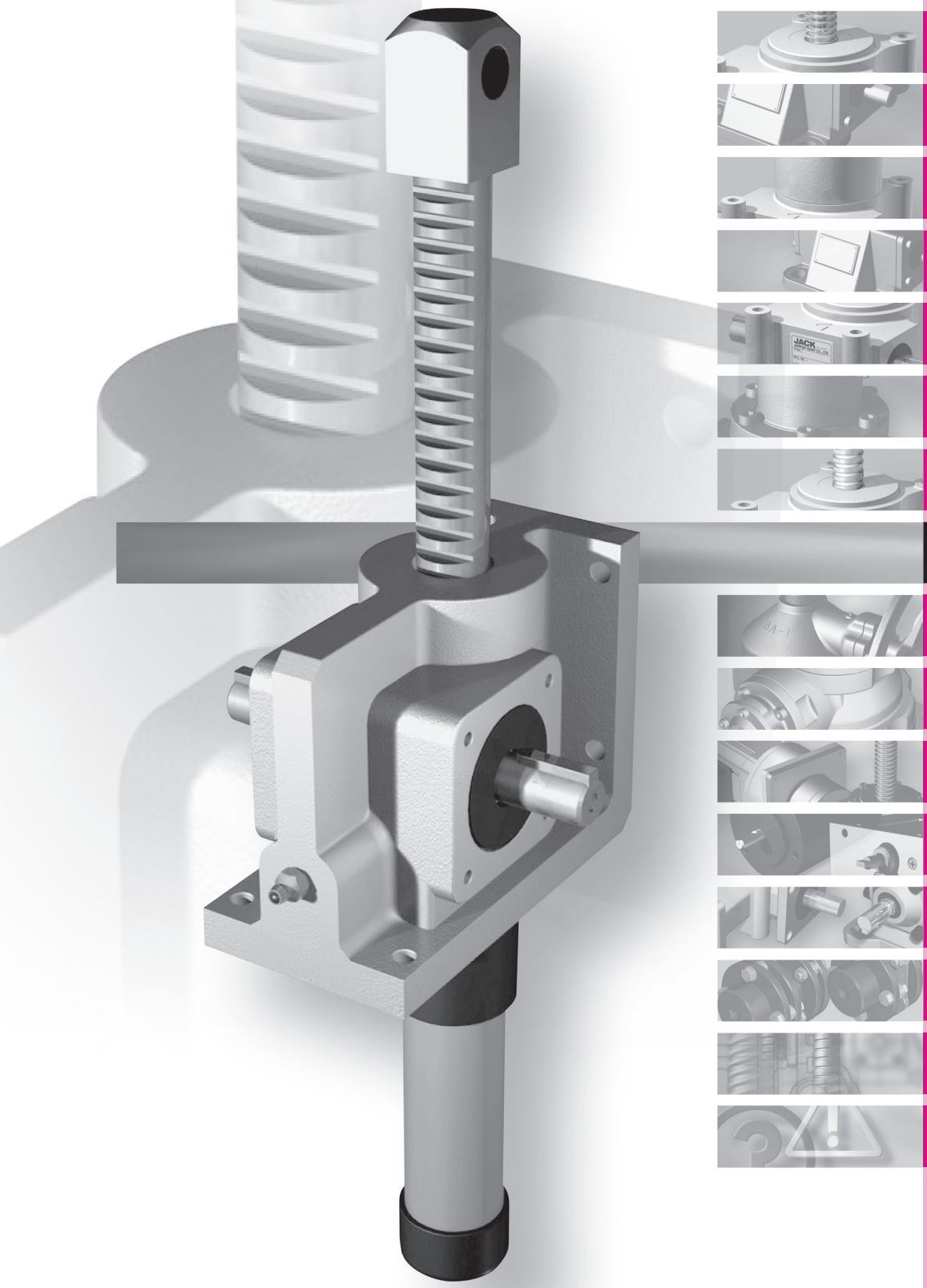
Rack Jack

08

High-speed conversion of linear motion into rotary motion and vice versa

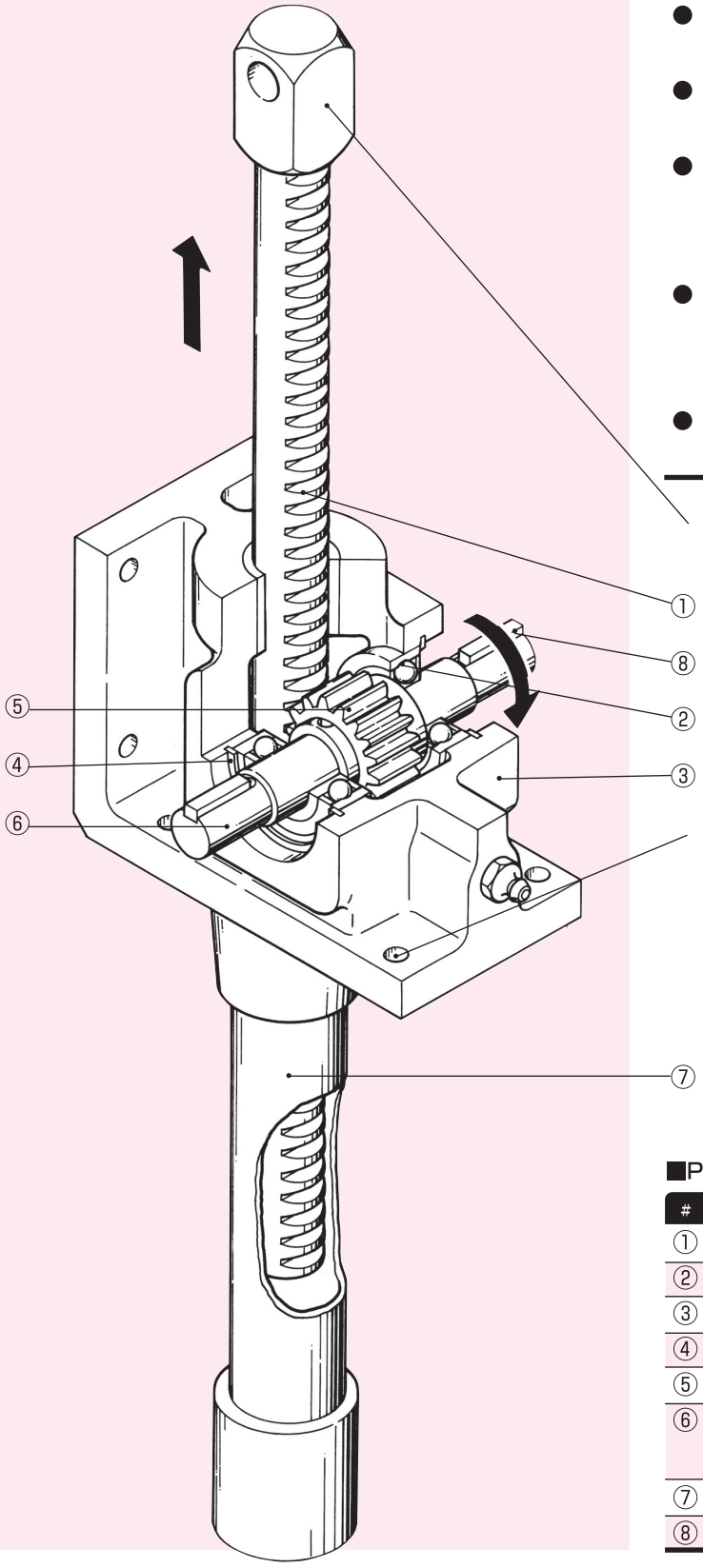


Structure & Features

Rack Jack:Structure & Features

This jack is of a simple structure using a rack gear, and is highly efficient.

■Structural Drawing:
Upright Rack Jack



- This type is capable of two-way conversion: it can directly convert rotary motion into linear motion, or linear motion into rotary motion.
- It allows high-speed linear motion, even when the input shaft is rotating at low speed.
- The jack delivers excellent mechanical efficiency with less power loss.
- This type has two mounting surfaces: one is in parallel with the rack's motion, and another at the right angle. You can choose whichever surface is convenient for your use.
- You can choose from 3 types of shaft end fittings, and wide-ranging options are available, including dustproof bellows to protect the rack shaft, limit switch for control, and RC encoder.
- The jack does not have a self-locking function, so it is required to install a brake.

The rack shaft end is designed to allow attaching various types of end fittings (e.g. clevis in the drawing).

① The rack shaft is made of carbon steel.

⑧ The input shaft key is the new JIS key.

② The input shaft adopts the ball bearing.

③ The housing is made of ductile cast iron.

As a mounting surface, you can choose either the bottom or side surface of the case.

■Part Names

#	Part name
①	Rack shaft
②	Bearing
③	Housing
④	Snap ring
⑤	Rack pinion
⑥	Input shaft *JSR type: the rack pinion and input shaft are integrated.
⑦	Rack shaft cover
⑧	Key

Specification

Standard Specifications

Series/size code	JMR	JSR
Capacity	2kN	4kN
Rack shaft diameter / module	20mm·M2	30mm·M3
Efficiency	0.90	0.90
Maximum allowable power per jack	0.29kW	0.58kW
Maximum speed of rack shaft	8000mm/min	8000mm/min
Required input torque at allowable load	38N·m	113N·m
Rack shaft lead per rotation of input shaft	106.8mm/rotation	160.2mm/rotation
Maximum input rotation speed at maximum load	75min^{-1}	50min^{-1}
Input shaft allowable overhang load	130N	700N
Amount of filled grease	50g	60g
Operating temperature range	−15～80℃	−15～80℃

As for rack jacks, the required input torque is to be calculated on a pro-rata basis.

■Example: JSR when the load is 2kN

Required input torque at allowable load 113 N·m
Required input torque at load of
2kN is calculated as follows:

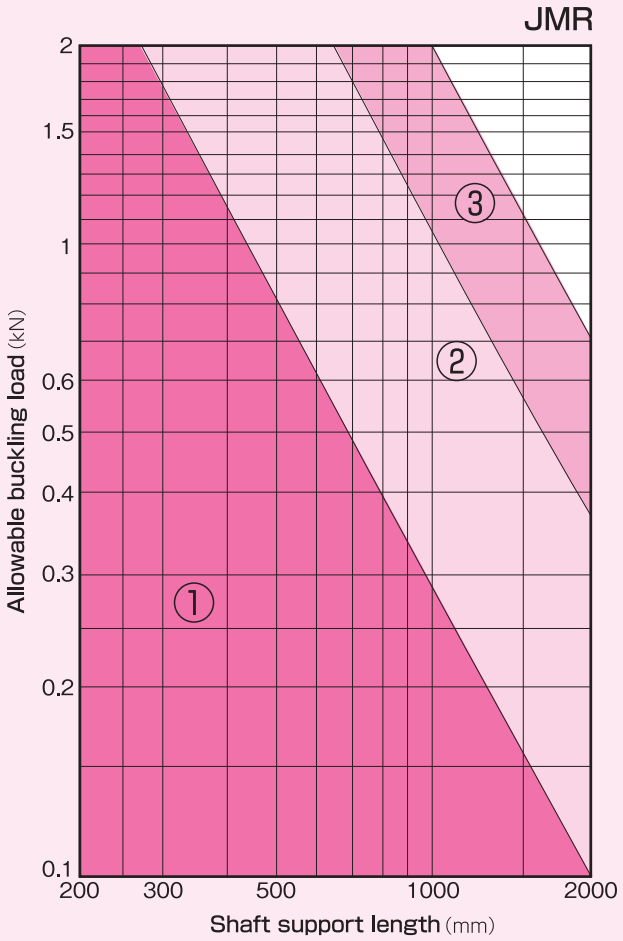
$$113 \times \frac{2}{4} = 56.5\text{N·m}$$

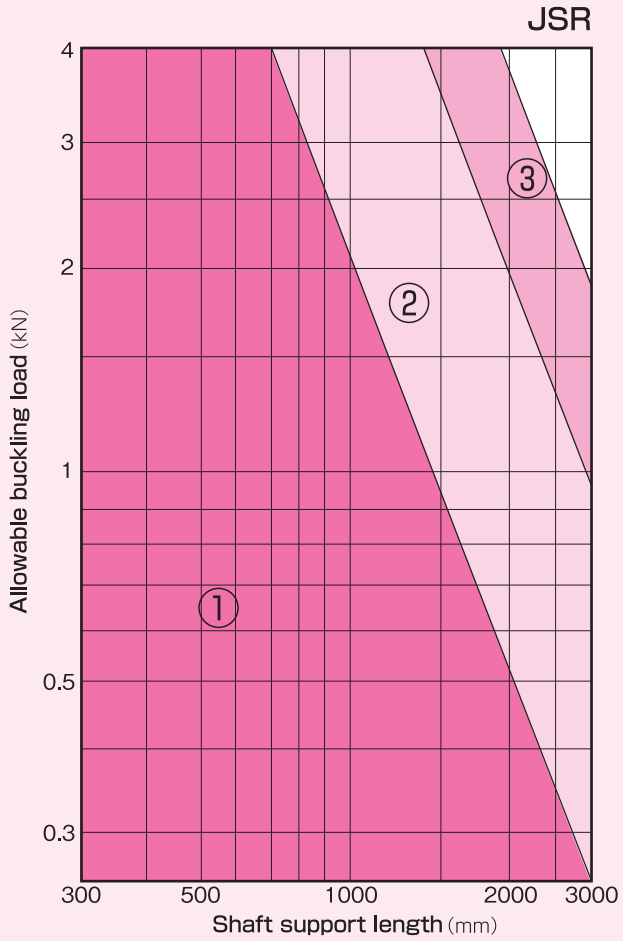
Allowable buckling load

Allowable Buckling Load

Longer stroke lengths with loads in compression are subject to buckling. Buckling loads differ depending on screw ends and whether the main part is fixed or supported. Please refer to the following graphs, and select the series/size at the intersection of load (vertical axis) and shaft support length (horizontal axis) or above it. * When loaded in tension, there is no need to consider buckling.

①:Jack fixed / shaft end free n=1/4 ②:Jack supported / shaft end supported n=1 ③:Jack fixed / shaft end supported n=2



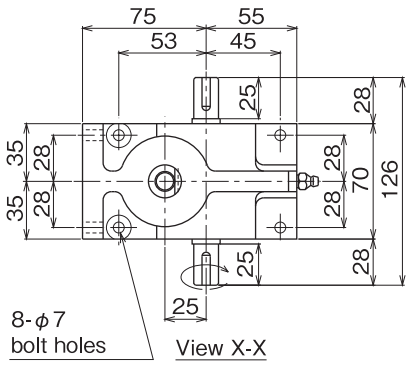


JMR
Dimensional
Drawing

Dimensional Drawing: JMR Translating Rack Jack

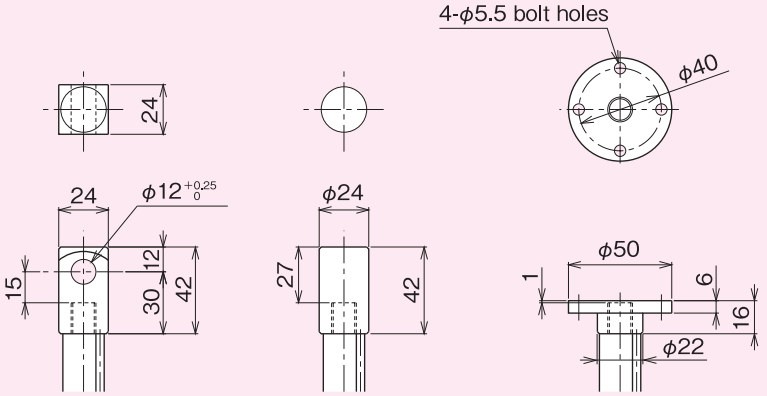
When the input shaft rotates in the direction indicated by an arrow, the rack shaft ascends.

Two-dimensional drawing

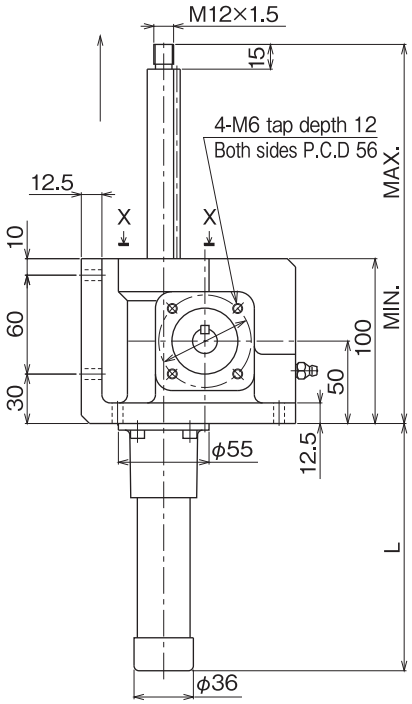


Dimensional drawing of screw end fittings

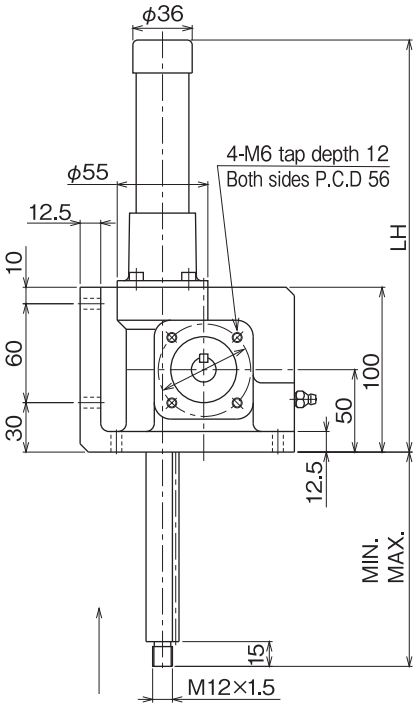
Clevis | Plain end | Flange



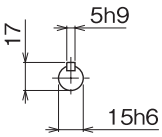
Upright



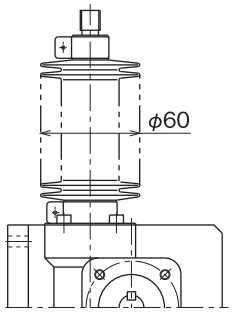
Inverted



Dimensional drawing of input shaft end



Outer diameter of bellows



■JMR Rack Jack Measurement Table

Stroke	U: Upright					I: Inverted				
	N: Without bellows		B: With bellows		L	N: Without bellows		B: With bellows		LH
	MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.	
100	130	230	185	285	150	30	130	85	185	250
200	130	330	185	385	250	30	230	85	285	350
300	130	430	215	515	350	30	330	115	415	450
400	130	530	215	615	450	30	430	115	515	550
500	130	630	225	725	550	30	530	125	625	650
600	130	730	225	825	650	30	630	125	725	750
800	130	930	275	1075	850	30	830	175	975	950
1000	130	1130	345	1345	1050	30	1030	245	1245	1150
1300	130	1430	345	1645	1350	30	1330	245	1545	1450
1800	130	1930	465	2265	1850	30	1830	365	2165	1950

■Approximate Weight(kg)

Stroke	Without bellows	With bellows
100	4.5	5
200	5	5.5
300	5.5	6
400	6	6.5
500	6.5	7.5
600	7	8
800	8	9
1000	9	10.5
1300	10.5	12
1800	13	15

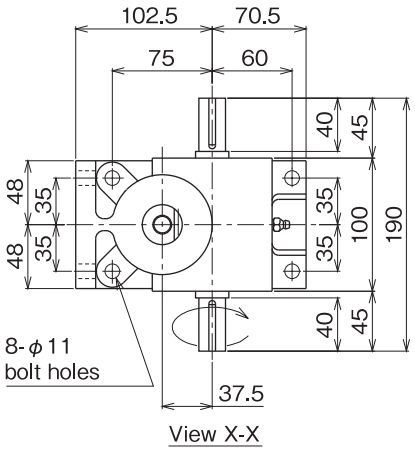
· If your required stroke is not shown in the above table, please consult with us, as we can manufacture what you need.

JSR Dimensional Drawing

Dimensional Drawing: JSR Translating Rack Jack

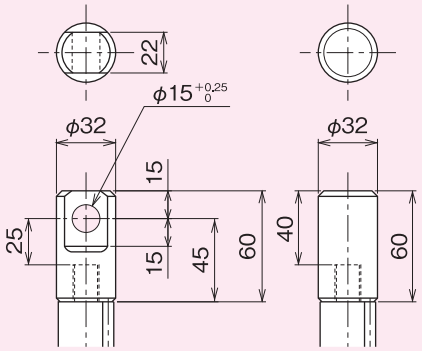
When the input shaft rotates in the direction indicated by an arrow, the rack shaft ascends.

Two-dimensional drawing



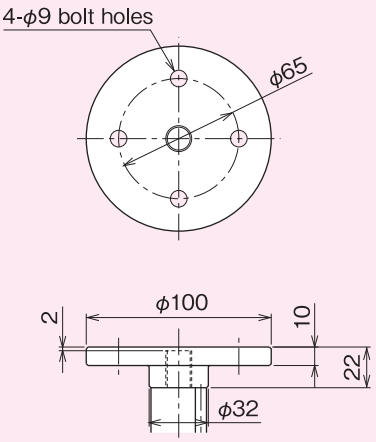
Dimensional drawing of screw end fittings

Clevis

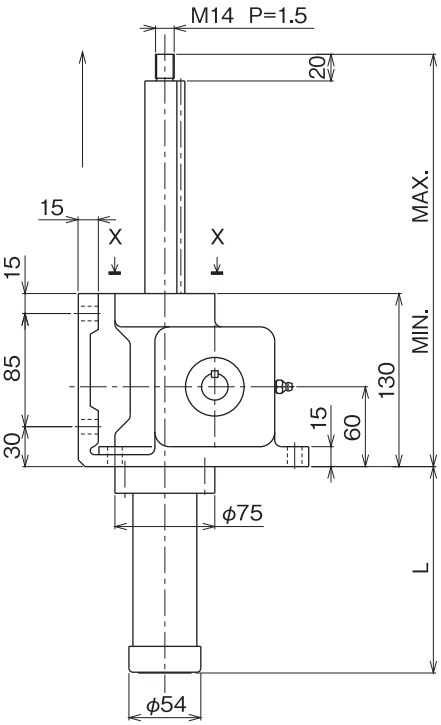


棒 端

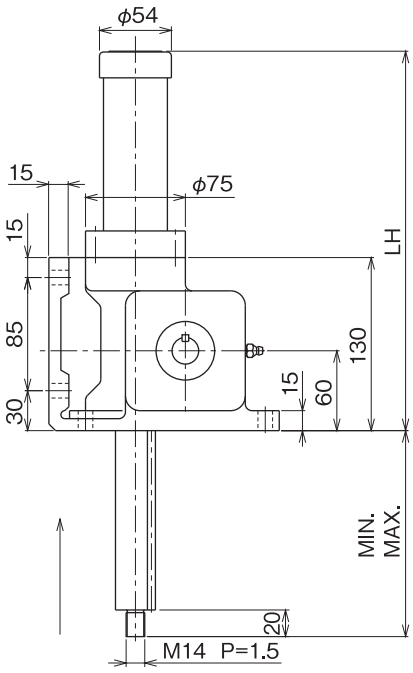
Flange



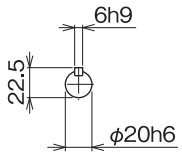
Upright



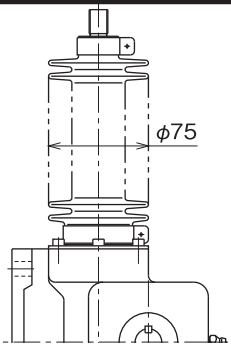
Inverted



Dimensional drawing of input shaft end



Outer diameter of bellows



■JSR Rack Jack Measurement Table

Stroke	U: Upright					I: Inverted				
	N: Without bellows		B: With bellows		L	N: Without bellows		B: With bellows		LH
	MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.	
100	170	270	210	310	155	40	140	80	180	285
200	170	370	210	410	255	40	240	80	280	385
300	170	470	245	545	355	40	340	115	415	485
400	170	570	245	645	455	40	440	115	515	585
500	170	670	245	745	555	40	540	115	615	685
600	170	770	285	885	655	40	640	155	755	785
800	170	970	285	1085	855	40	840	155	955	985
1000	170	1170	380	1380	1055	40	1040	250	1250	1185
1300	170	1470	380	1680	1355	40	1340	250	1550	1485
1800	170	1970	500	2300	1855	40	1840	370	2170	1985

■Approximate Weight (kg)

Stroke	Without bellows	With bellows
100	11.5	12.5
200	12.5	13.5
300	13.5	14.5
400	14.5	15.5
500	15.5	16.5
600	16.5	17.5
800	18	19
1000	20	21.5
1300	23	25
1800	27.5	29.5

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