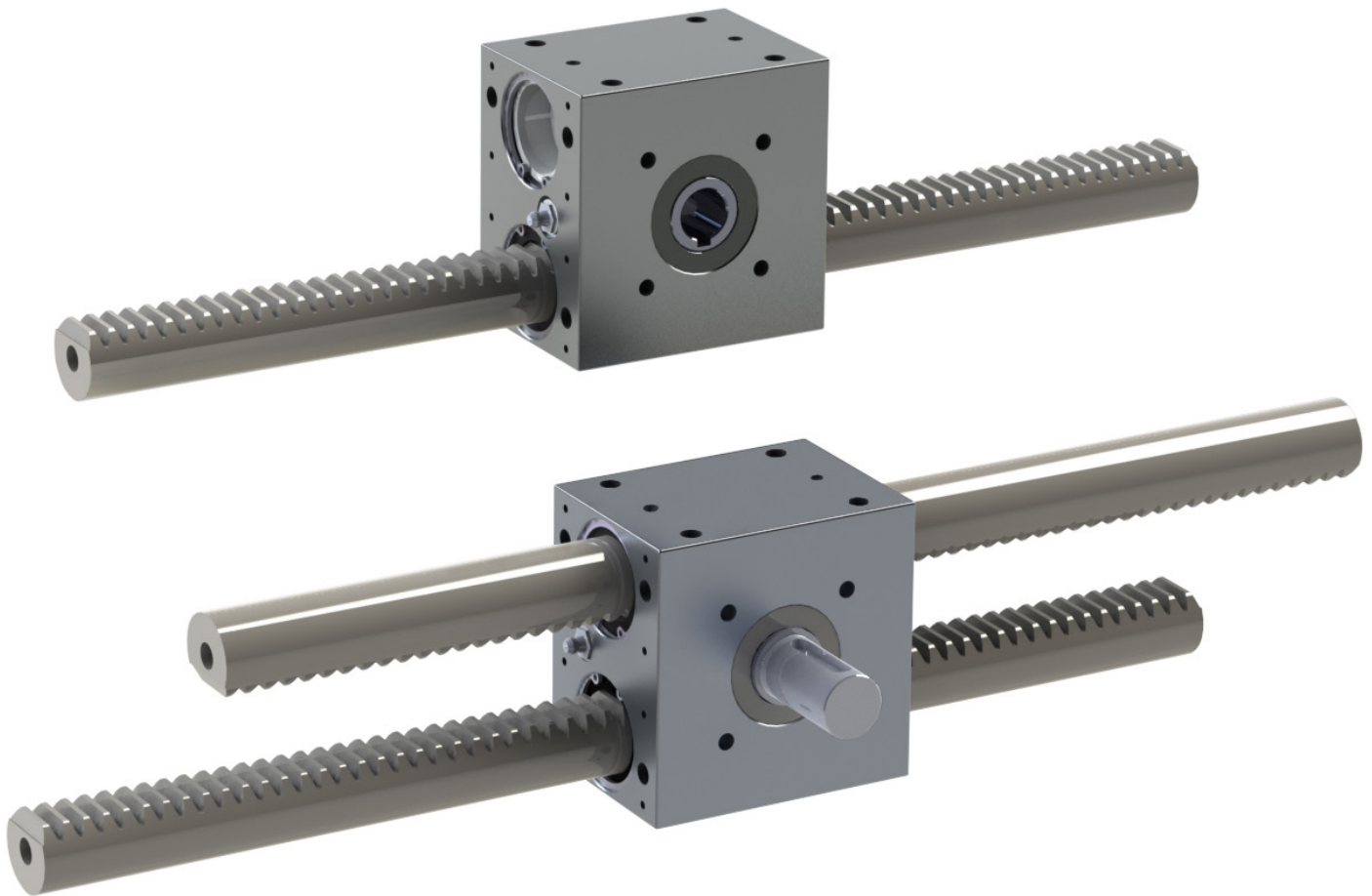


# RACK JACK

## Synchronous Lifting Systems

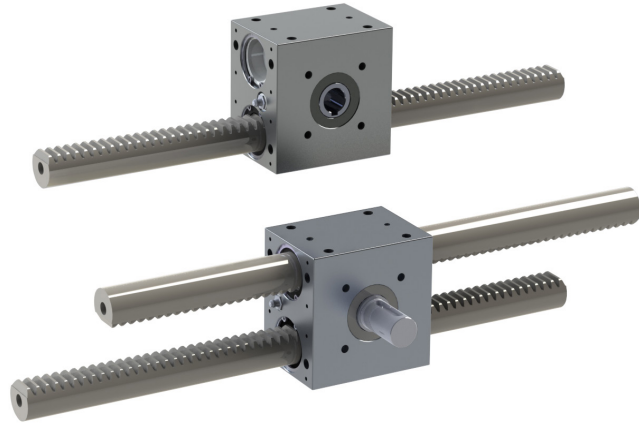


WMH Herion  
part of your drive

**ANDANTEX**  
USA Inc.

## Operation

The Rack Jack from WMH Herion provides simple synchronous lifting motion. The system of rack and pinion transforms linear motion to rotation and vice versa. The force-locked connection between the lifters or drive components is achieved by shafts with round profiles.



The rack jacks are available with one or two racks. In the double version, the racks move in opposite directions.

This simple mechanical principle ensures a failure-free, durable and reliable operation of the product. Thanks to its compact construction in robust square housings, the lifters are particularly insensitive to external influences.

## Characteristics

- Simple and cost-effective lifting devices
- Robust design for long service life and continuous use
- High bending stiffness due to the large diameter and wide teeth on the rack
- Robust sliding guide for the rack
- Simple structure, high repeatability
- Average lifting speed, precise positioning in the lifting direction
- Complete range consisting of 6 sizes with 800 N (180 Lbs.) - 160,000 N (35,971 Lbs.) lifting force
- All sizes with same design principle and function
- Numerous mounting options incl. flange connection.
- 4 pinion shaft interface options for sizes 1-3. Size 4-6 have pinions customized to customer needs.
- Housing Aluminum (sizes 1-3) or fabricated steel (sizes 4-6)

## Application Areas

- Lifting of frames of all kinds
- Feed devices
- Feeding system for nozzels, suction devices, etc.
- Gripper movement / closing movement
- Sequential width adjustment
- Lifting columns for the raising and lowering of conveyor belts or other conveyor systems
- Height adjustment on pivoting devices
- Turning and tilting systems
- Lift tables for the lifting of car bodies in the automotive industry
- Lift tables with different structures, such as roller conveyors and clamping frames (used in automobile production)
- Centering and pushing together bottles on filling machines
- Pushing in / pushing forward packages in the packaging industry
- And many more...

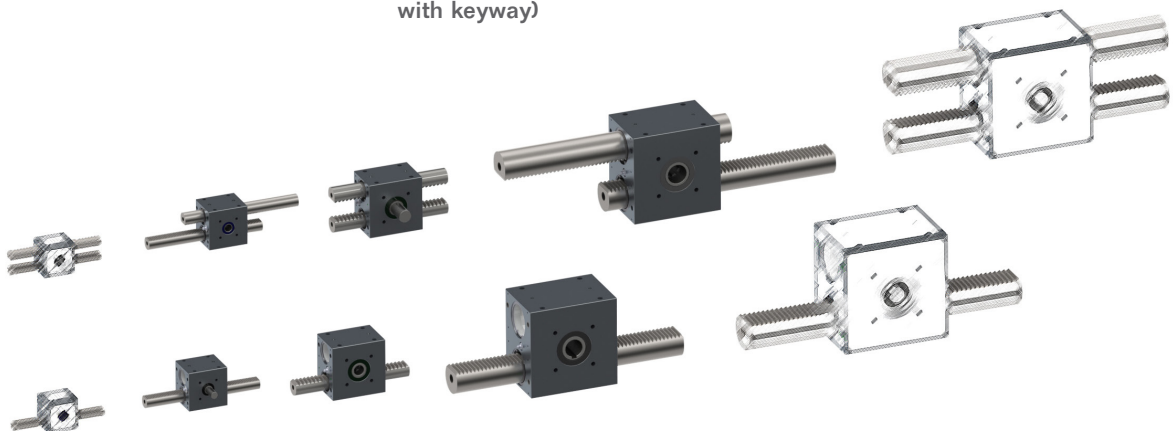
## Performance Data - Rack Jack (Round Rack Type)

	Unit	1	2	3	4	5	6
Lifting force - $F_{max}$	N	800	2000	8000	25,000	70,000	160,000
	(Lbs.)	180	450	1800	5620	15,735	35,971
Lifting Speed - $V_{max}$	m/s	0.6	0.6	0.6	0.6	0.6	0.6
	(in/s)	24	24	24	24	24	24
Acceleration - $a_{max}$	m/s <sup>2</sup>	30	30	30	30	30	30
	(in/s <sup>2</sup> )	1180	1180	1180	1180	1180	1180
Torque - $M_{tmax}$	Nm	8	40	240	1250	5600	18240
	(Lb.In.)	71	354	2125	11070	49594	161533
Pitch circle diameter - $\varnothing d$	mm	20	40	60	100	160	228
	(in.)	0.79	1.57	2.36	3.94	6.30	8.98
Ratio - Stroke	mm/360°	62.8318	125.6637	188.4955	314.1593	502.6548	716.2831
	(in./rev.)	2.474	4.947	7.421	12.368	19.790	28.200

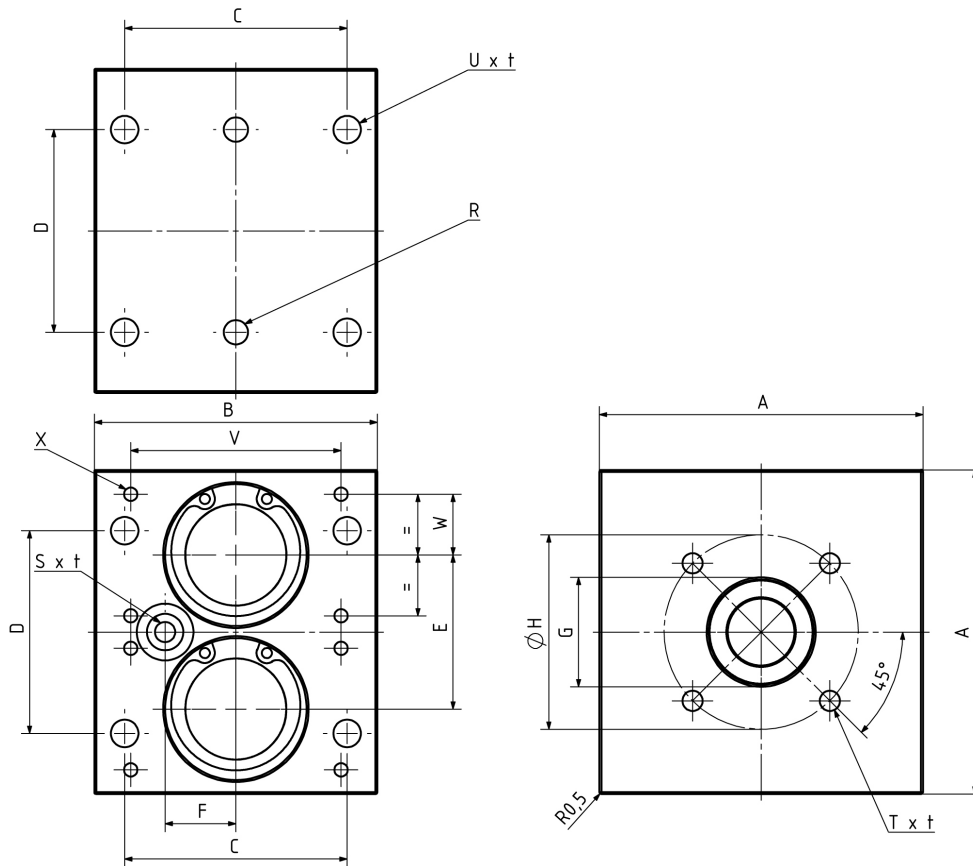
## Configuration - Rack Jack (Round Rack Type)

### 541 - X X X - X X X

Type	Size	Pinion Shaft Design	Number of Racks	Length of Rack
541 = Rack Jack (Round Rack Type)	1	1 = Pinion shaft (spline profile)	1 = Version with 1 rack 2 = Version with 2 racks	Please state here the desired total length of the rack by indicating the <b>Number of teeth</b> of the rack
	2			
	3	2 = Pinion shaft (shaft end on one side)		
	4			
	5	3 = Pinion shaft (shaft end on both sides)		
	6	4 = Pinion shaft (hollow shaft with keyway)		



# TECHNICAL DATA - RACK JACK (ROUND RACK TYPE) SIZES 1 - 3



## Gearbox dimensions

Size	A	B	E	F	G	S x t	X x t
1	80	70	38	20	26	M10 x 1 x 10	M4 x 6
2	110	80	61	15	47	M10 x 1 x 10	M4 x 8
3	180	130	99	15	72	M10 x 1 x 10	M4 x 8

- G** Centering flange (when using gasket please remove)
- t** Depth dimension
- S** Lubrication hole
- X** Rack protection

## Mounting dimensions

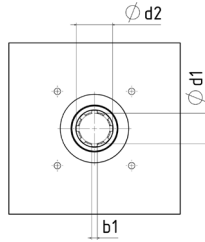
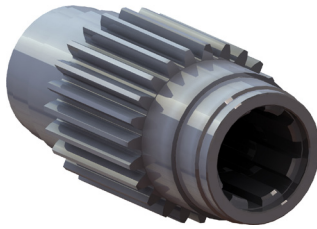
Size	C	D	H	R <sup>H7</sup> x t	T x t	U x t (Ø <sup>**</sup> )	V	W
1	55	50	48	6 x 5	M6 x 12	M8 x 16 (Ø 6,8)	52	15
2	60	72	72	6 x 3	M8 x 12	M10 x 20 (Ø 8,5)	60	18
3	105	120	110	6 x 5	M10 x 20	M12 x 27 (Ø 10,2)	100	35

- t** Depth dimension
- Ø<sup>\*\*</sup>** Value in brackets corresponds to the through hole below the thread

Custom solutions available on request to meet installation space constraints - we offer the design and manufacturing of housings according to customer specifications. Please contact us to define the dimensional requirements.

For sizes 1 - 3 of the rack jack, 4 pinion shaft designs for a variety of connection options are available. The pinion tooth geometry is identical in each size for all rack jack types. Customized pinion shafts are available on request.

**1. Pinion shaft with spline profile - splined bore dimensions**

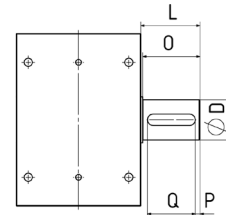
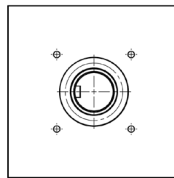
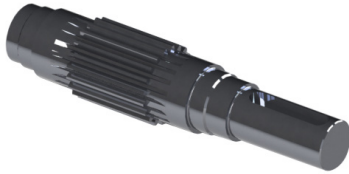


Spline profile DIN ISO 14

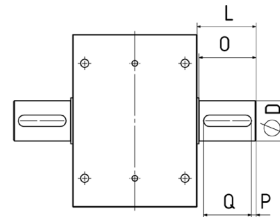
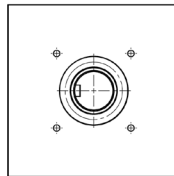
a: Number of splines  
(drawing shows size 3)

Size	a x d <sub>1</sub> x d <sub>2</sub>	b <sub>1</sub>
1	6 x 11 x 14	3
2	6 x 16 x 20	4
3	8 x 32 x 38	6

**2. Pinion shaft with shaft end on one side - shaft extension dimensions**



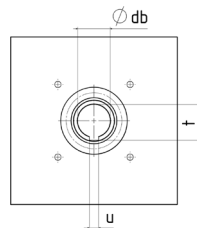
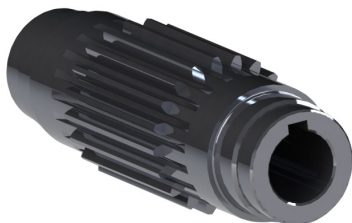
**3. Pinion shaft with shaft end on both sides - shaft extension dimensions**



Keyway acc. to DIN 6885 P9

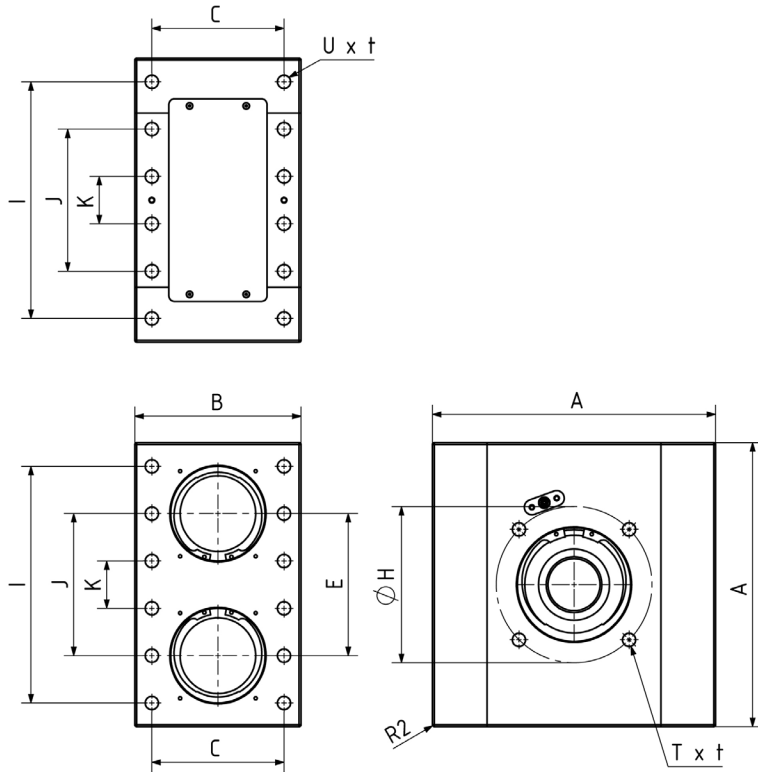
Size	$\phi D$ <sup>h7</sup>	L	O	P	Q
1	14	32	30	2	25
2	25	47	45	5	36
3	42	62	60	5	50

**4. Pinion shaft (hollow shaft) with keyway - bore dimensions**



Keyway acc. to DIN 6885 P9

Size	$\phi D$ <sup>h7</sup>	u	t
1	10	3	11.4
2	20	6	22.8
3	35	10	38.3



**Gearbox dimensions**

Size	A	B	E	G	X x t
4	300	176	150	120	M4 x 6
5	450	260	on request	on request	on request
6	550	320	on request	on request	on request

- G Centering flange (when using gasket please remove)
- t Depth dimension
- X Rack protection

**Mounting dimensions**

Size	C	H	I	J	K	T x t	U x t
4	140	165	250	150	50	M16 x 32	M16 x 32
5	on request						
6	on request						

- t Depth dimension

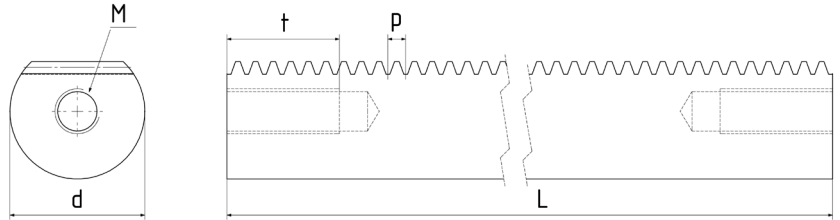
On request - for example in case of deviating available installation space or in the context of a complete custom-made solution - we offer to design and manufacture housings according to customer specifications. This applies particularly to size 5 and 6 housings. Please contact us to clarify individual production capabilities.

**Individual Solutions - Pinion Shafts Sizes 4 to 6**

From size 4 on, the pinion shafts of the Rack Jack are manufactured exclusively to customer specifications and drawings. In advance, a detailed examination of the respective application and a corresponding design and construction of the pinion shaft takes place. Close coordination with the customer is a matter of course.

In the rack jack, the racks transfer tension and compression forces; they do not accept transverse forces. Slide bushings are used to support the racks.

**Straight teeth**  
 Pressure angle 20°  
 Toothing quality 8 h27  
 Outer diameter is ground h6



For Size	Module	d <sup>h6</sup>	M x t	Material	[kg/m]	p	L = z x p
1	1.0	25	M10 x 30	ETG®100	3.50	3.1416	acc. to customer specifications, please state the required number of teeth in your request & order
2	2.5	32	M12 x 35	ETG®100	5.50	7.8540	
3	2.5	60	M20 x 50	ETG®100	19.10	7.8540	
4	5.0	80	M24 x 45	C45, hardened	33.90	15.7080	
5	8.0	120	on request	C45, hardened	76.70	25.1327	
6	12.0	150	on request	C45, hardened	117.60	37.6991	

z: Number of teeth  
 p: Pitch

ETG® 100 is a high-quality alloy steel with a tensile strength of 960-1100 N/mm<sup>2</sup>.

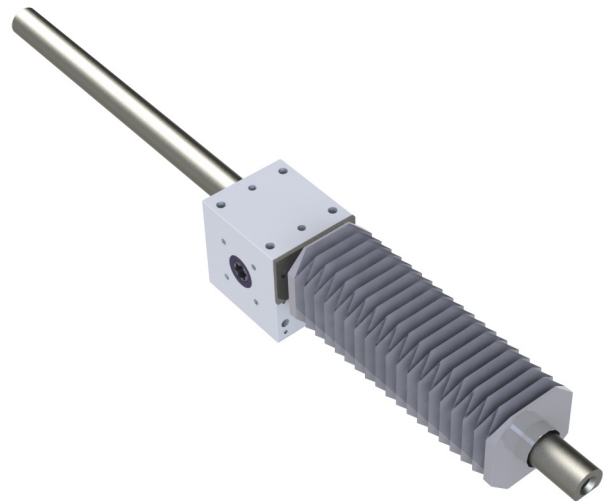
The standard design of the rack includes a mounting thread (M x t, stated in the table) on both ends. Please inquire for custom machined rack ends according to application requirements and drawings.

### Protective Cover & Fastening Device

For use in environments that are heavily contaminated with dust or metal abrasion, our rack jacks can be equipped with a protective cover.

Bellows protect the racks from contamination and accumulation of dirt and dust and prevent damage to the rack jack by foreign particles.

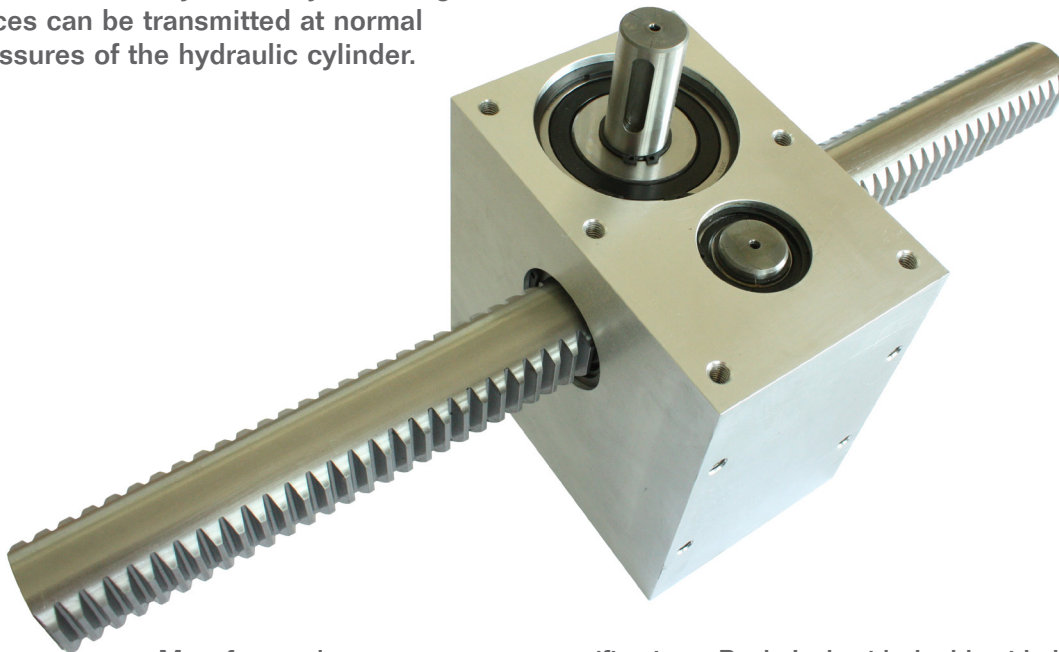
The protective cover is easy to use and is designed and customized for each rack jack. In case of need, please mention this in your inquiry.



The concept of the classic Rack Jack is developed further in the Rack Jack with double sided toothed rack. Due to the design of the rack with double sided toothing, it is possible to transmit up to twice as high a load with the same rack diameter while keeping the moving mass of the rack comparatively low at the same time. This is particularly advantageous in applications with faster, shorter and dynamic strokes, since the moving mass is lower.

In addition, a very balanced power ratio is achieved by the introduction of forces on two opposite sides of the rack. Thus, the load values that affect the sliding bearing of the round rack are reduced. The service life of the components and thus of the entire Rack Jack is thereby significantly increased.

Also in comparison with hydraulic cylinders, the Rack Jack with double sided toothed rack presents itself as an advantageous alternative: comparing the rack diameter with the piston diameter of the hydraulic cylinder, higher forces can be transmitted at normal pressures of the hydraulic cylinder.

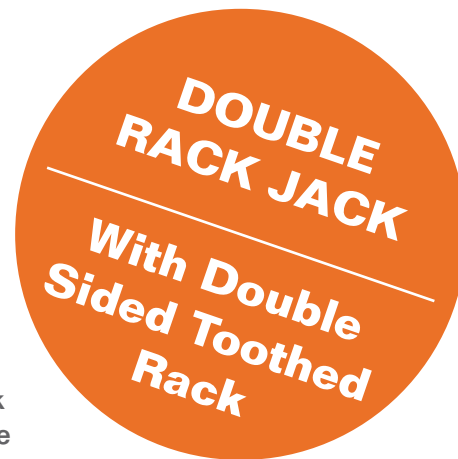


Manufactured acc. to customer specifications: Rack Jack with double sided toothed rack

The Rack Jack with double sided toothed rack is available as a custom-made product according to customer requirements.

In close coordination with the customer, a precise examination of the respective application and a corresponding design and construction of the Rack Jack takes place. The realization of the development takes place on request in prototype construction, in one-off production as well as series.

We are looking forward to receiving your inquiry.

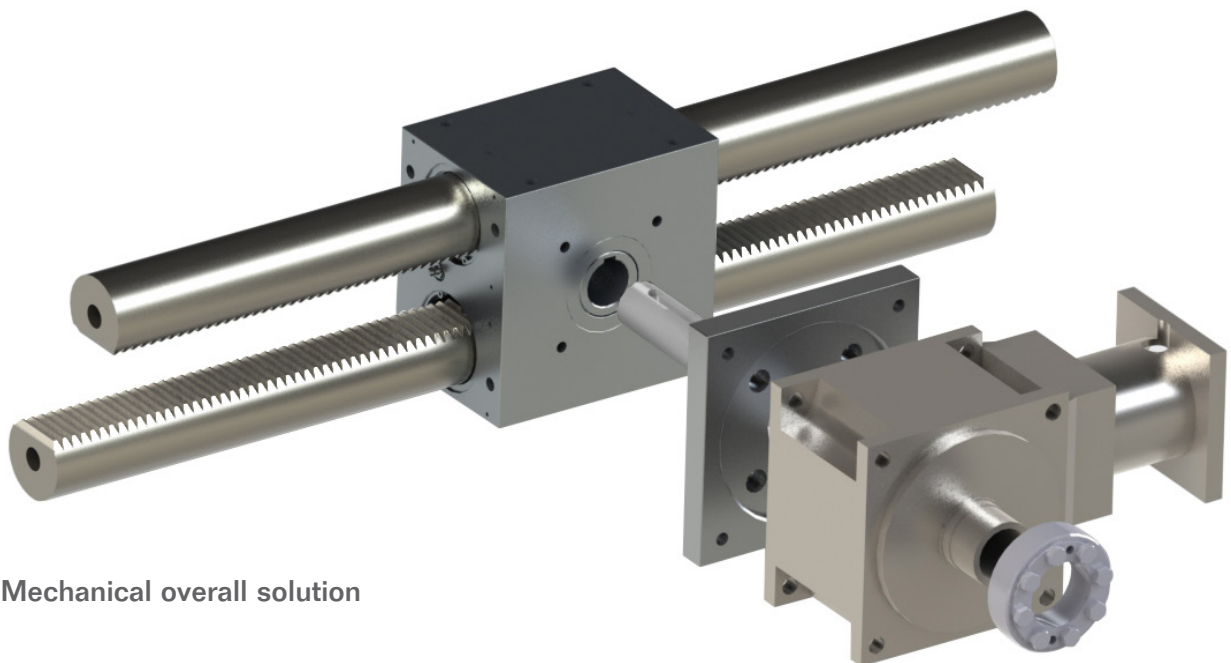




In addition to our standard product range, we manufacture rack jacks according to your requirements. Please send us your inquiry with application details and we will advise regarding design, construction and manufacturing capabilities.

### Variations & Customization

- Technical design and complete manufacturing of customized rack jacks (in terms of performance, travel speeds, stroke, the connection of multiple rack jacks, etc.)
- Individual housing designs
- Pinion shafts, custom-made for different connection options, such as pinion shafts with different inner profiles or design of the shaft ends according to customer requirements and drawing
- Rack lengths and end machining according to customer requirements and drawing.
- Rack protection (individually, adapted to stroke length)



Mechanical overall solution

### Service

- Calculation tool
- 3D-CAD data files

can be provided upon request.

**ANDANTEX**  
USA Inc.

1705 Valley Road • Wanamassa, NJ 07712

Phone: 800.713.6170 • 732.493.2812 • Fax: 732.493.2949 • E-mail: [info@andantex.com](mailto:info@andantex.com) • [www.andantex.com](http://www.andantex.com)