

# Welding positioners



# PEMA Welding positioners

Welding positioners increase working flexibility, productivity, and quality. Positioners also support the job of the welder, ensuring a safer working environment and better working ergonomics. The main advantage of PEMA welding positioners is that workpieces can always be set up to the best possible welding positions. As a result, welding productivity can be raised by as much as 70%.

At Pemamek we have been designing and manufacturing welding positioners for demanding and heavy workpieces welding for half a century. Our welding positioners are a combination of robust design and intelligent

technology that can effortlessly be integrated with other PEMA solutions. Each of our welding positioners is designed in-house and manufactured with high-quality components.



When welding is carried out ergonomically, it results in an instant improved quality and a safer working environment.

## 50 years of productive and quality welding

When Pemamek was established over 50 years ago, in 1970, the very first product was a small positioner. First positioners were delivered within the company's home country Finland, but already in the midst of 1970, Pemamek started to deliver positioners abroad as well, first to Sweden and Norway.

## Typical applications for heavy positioners:

- Automated and manual welding of heavy thick-walled machine components
- Assembling and welding of energy sector components (pumps, valves, etc.)
- Cladding of pressure vessel components
- Propeller housings, winches, and other shipbuilding and offshore industry components



PEMA welding positioners for mechanised and automatic welding ensure working safety, raise quality, and improve work motivation.

## Skymaster PRO series

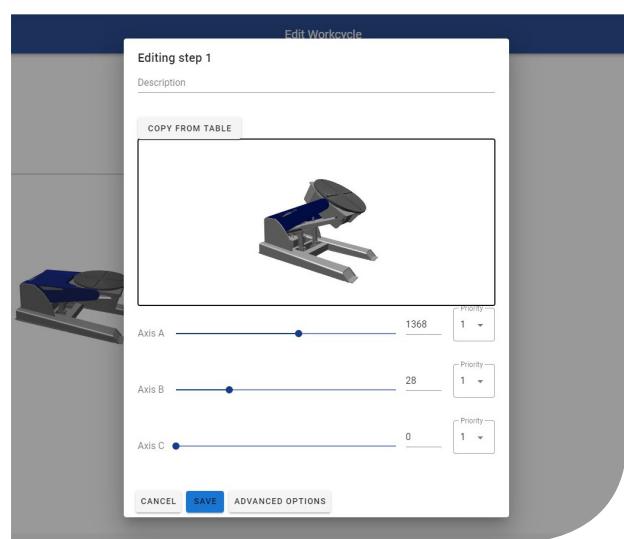
The PEMA Skymaster PRO (APSi) welding positioner series is a fusion of modern digitality and Pemamek's signature positioning technology. The PEMA Skymaster PRO series expands the handling capabilities of previous Skymaster positioners with new intelligent software that enables the pre-programming of work cycles and handling positions.



PEMA APSi 1500 Skymaster PRO.



Remotely programmable movements and memory function.



Always correct welding position to guarantee quality and ergonomics.

## Ideal partner for welders

All PEMA APSi 250 - 70000 positioners are equipped with adjustable rotation, tilting, and height movement functions. A possibility for step-less 3-axis work-piece adjustments guarantees optimal, productive, and ergonomic working positions.

Inverter-controlled AC-driven rotation movements are smooth and accurate in all loading conditions. Powerful, hydraulically-operated tilting and height adjustments always enable safe positioning of the workpiece into optimal welding and working positions.

The hydraulic system is equipped with in-built safety valves for hose damage. All movements are easily controlled by a handy remote controller, and the operator can monitor rotation speeds from an RPM display.

PEMA positioners are designed in close cooperation with the best professionals. Pemamek's extensive experience in designing and manufacturing welding automation solutions has been a key factor in the development of PEMA positioners. The positioners are elementary tools in every welding shop and are effective tools in increasing welding productivity and quality.

- Always correct welding and assembly positions
- Visual programming for all movements
- Improved welding quality
- Broad hydraulic 3-axis movements
- Better working ergonomics
- Fast production start-up
- Integration with other PEMA solutions
- High-quality components
- Extensive worldwide PEMA service

### Options

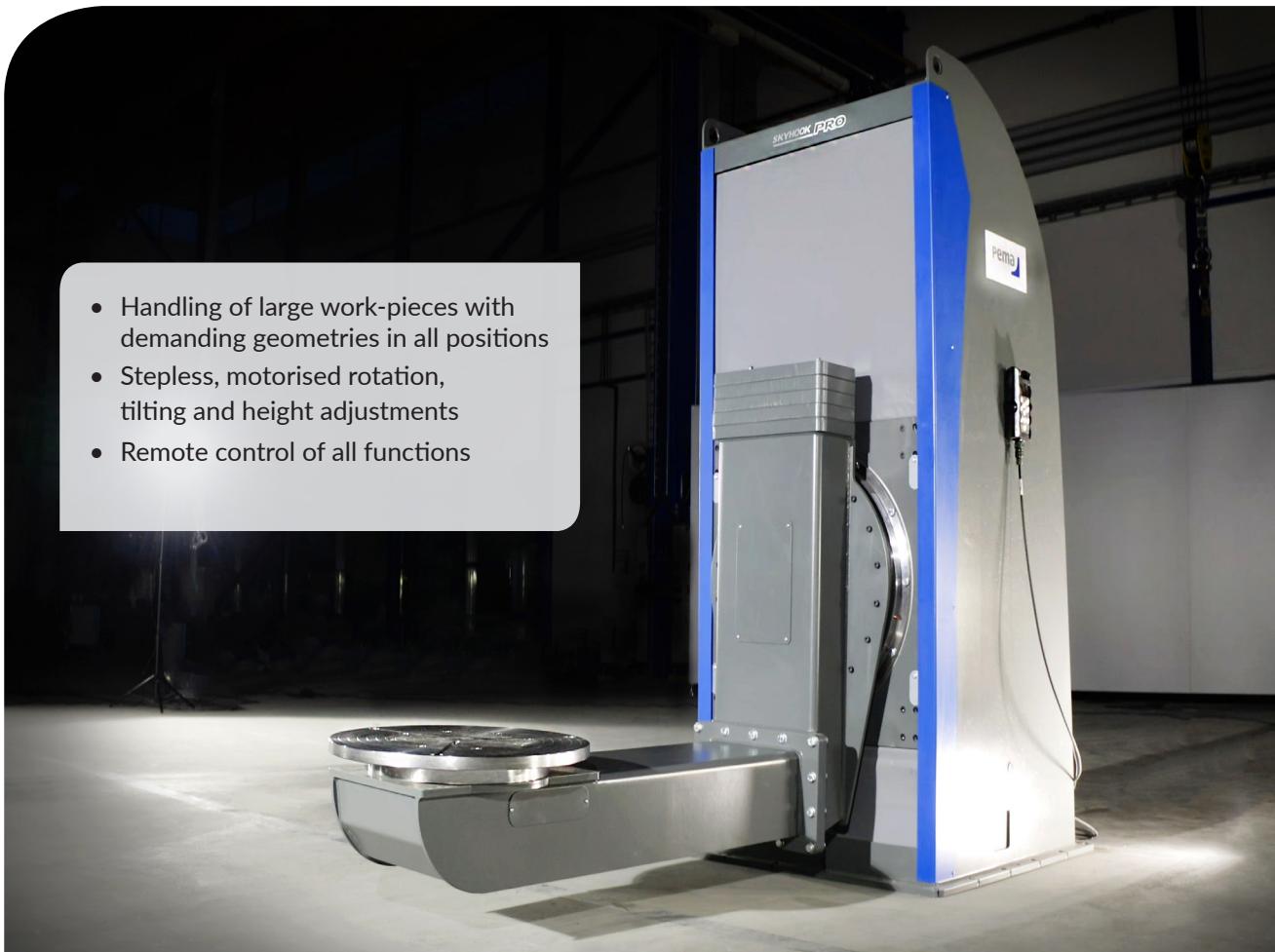
- Foot pedal for start/stop of rotation
- External control of rotation
- Wireless remote control

Technical info:	APS 250	APSi 750	APSi 1500	APSi 3500	APSi 7000	APSi 10000	APSi 15000	APSi 25000	APSi 35000
Max. load (N)	2 500	7 500	15 000	35 000	70 000	100 000	150 000	250 000	350 000
Rotation speed (rpm)	0,2 - 4,5	0,09 - 2,0	0,07 - 1,3	0,06 - 1,3	0,05 - 1,0	0,04-0,75	0,04 - 0,75	0,02 - 0,4	0,02 - 0,4
Max. rotational torque (Nm)	80	600	1 000	2 800	9 000	13 000	18 000	40 000	55 000
Tilting / angle (deg)	man 135	hyd 135	hyd 135	hyd 135	hyd 135	hyd 135	hyd 135	hyd 120	hyd 120
Tilting torque (Nm)	300	1 500	3 000	7 500	14 000	40 000	70 000	175 000	280 000
Max.welding current (A)	350	700	700	700	1 400	1 400	1 400	2100	2 100
Table plate diameter (mm)	400	700	700	950	1 100	1 350	1 450	1 950	1 950
Height min-max [H1-H2] (mm)	490 - 920	730 - 1 450	780 - 1 550	980 - 1 750	1 000 - 1 850	1 090 - 2 030	1 300 - 2 330	1 600 - 2 860	2 000 - 3 500
Length [L] (mm)	950	1 580	1 640	2 340	2 560	2 900	3 150	4 000	4 360
Width (mm)	540	700	810	1 030	1 490	1 590	1 820	1 950	2 120



## Skyhook PRO series

PEMA SPS Skyhook PRO (SPSi) positioners are built for demanding tasks with heavy workpieces and even the most complex product geometry. With Skyhook PRO, workpieces are easily set up in a wide variety of positions. Loading capacity range is 750 - 20 000 kg.

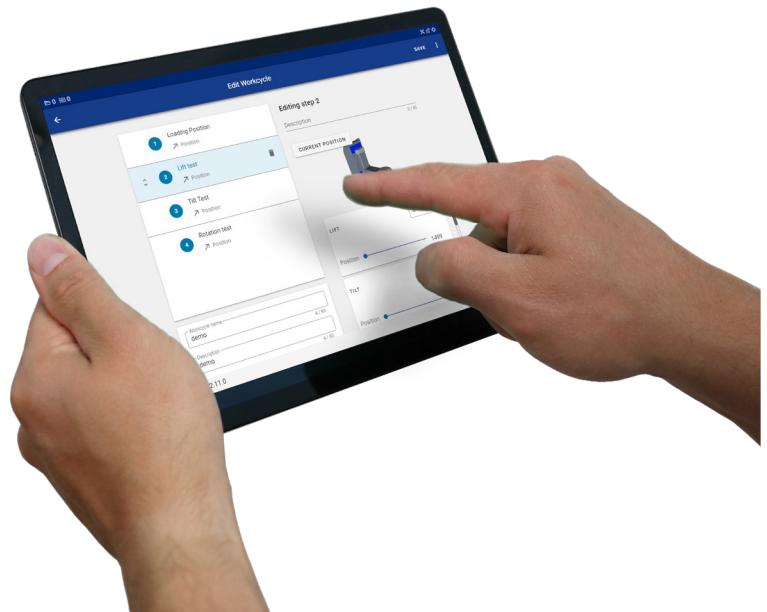


- Handling of large work-pieces with demanding geometries in all positions
- Stepless, motorised rotation, tilting and height adjustments
- Remote control of all functions

PEMA SPS 1500 Skyhook positioner



PEMA SPS 5000 Skyhook positioner



## Heavy work-pieces with a demanding product geometry

PEMA SPSi 750 - 20000 positioners are the right choice for heavy workpieces with demanding product geometry.

Typical workpieces are e.g., tractor cabins and construction machinery parts.

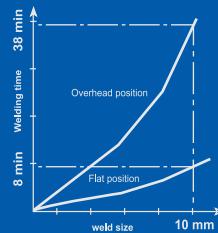
Workpieces can be adjusted in all conceivable positions with a Skyhook positioner. Usually, the rotation is around their center of gravity. This ensures that the welder's working position is always productive and ergonomically firm.

The stepless 3-axis adjusting function provides easy access for the welder up to even the most difficult welds inside the workpieces. Rotation of the table and tilting of the L-arm are controlled with inverter-controlled AC drives. Height adjustment is hydraulically operated. The hydraulic system has built-in safety valves.

Every PEMA product utilizes high-quality components. All structures and components are of serial production and testing.

Designed to the same high-quality standards as PEMA roller beds and column & booms, PEMA positioners fulfill the requirements of the European EN-safety norm.

Positioner can improve welding productivity up to 70%!



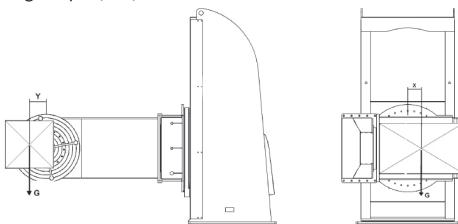
### Load Calculation

Loading torques should always be calculated from the surface of the table plate to the centre of gravity of the work-piece.

When choosing positioners, the torque of the work-piece should be compared with the maximum allowable torque in the appropriate table.

Rotational torque (Nm):  $G \times Y$

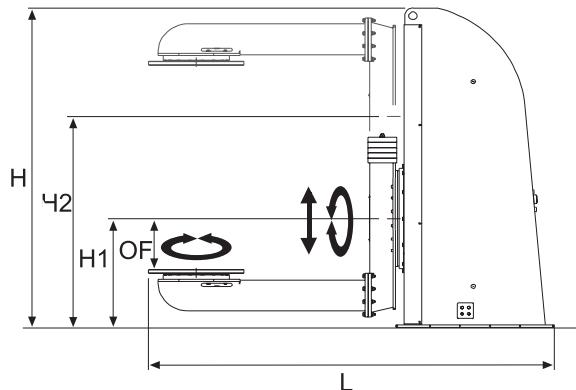
Tilting torque (Nm):  $G \times X$



$G$  (N) = weight of workpiece (kg) x gravity factor approx 10 (m/s<sup>2</sup>)

$Y$  (m) = distance from the centre of the table plate to workpiece centre of gravity

$X$  (m) = distance from the tilting axle to workpiece centre of gravity



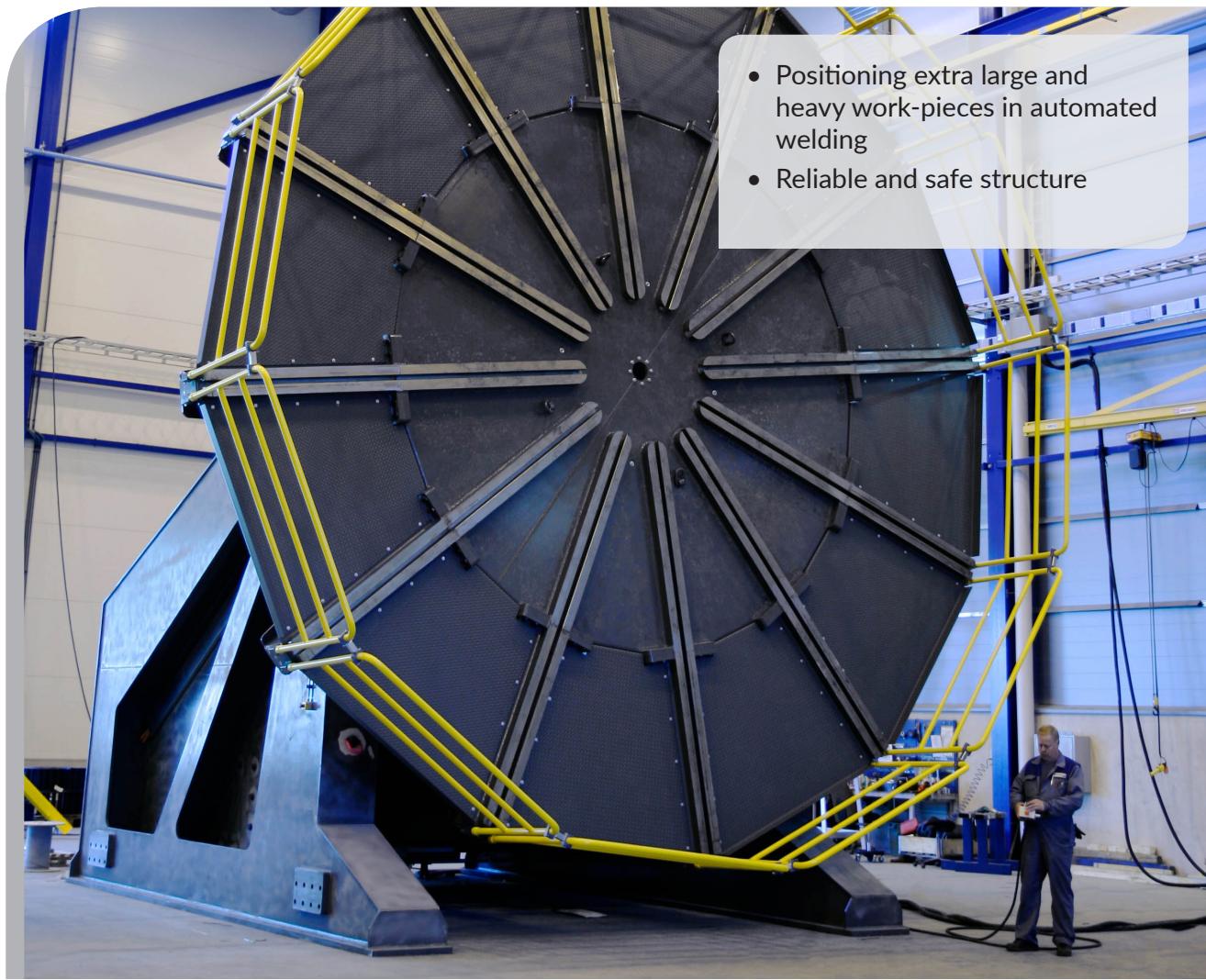
### Options

- Foot pedal for start/stop of rotation
- External control of rotation
- Wireless remote control

Technical information	SPSi 750	SPSi 1500	SPSi 3500	SPSi 5000	SPSi 10000	SPSi 15000
Max load (N)	7 500	15 000	35 000	50 000	100 000	150 000
Rotation speed (rpm)	0,09 - 2,0	0,07 - 1,3	0,08 - 1,6	0,05 - 1,0	0,04 - 0,75	0,04-0,75
Max rotational torque (Nm)	600	1000	2 800	6 000	18 000	18 000
Tilting speed (rpm)	0,1 - 1,5	0,1 - 1,0	0,1 - 0,8	0,1 - 0,75	0,1 - 0,4	0,1-0,4
Max tilting torque (Nm)	1 500	3 000	6 000	10 000	20 000	20 000
Adjust. tilting axle height min-max [H1-H2] (mm)	700 - 1 500	850 - 1 650	1 100 - 1 900	1 200 - 2 200	1 900 - 2 700	1 600-2 600
Offset distance [OF] (mm)	400	400	400	500	1 000	1 000
Table plate diameter (mm)	700	700	950	1 100	1 490	1 490
Max welding current (A)	700	700	700	1 400	1 400	1 400
Max workpiece diameter (mm)	2 100	2 400	3 000	3 800	4 000	4 200
Height [H] (mm)	2 350	2 500	3 060	3 300	4 500	4 500
Length [L] (mm)	2 660	2 980	3 680	4 200	5 540	5 540
Width (mm)	1 150	1 160	1 450	1 760	2 140	2 140

## Megamaster series

PEMA FPS Megamaster positioners are most suitable in large and heavy objects handling. They have exceptional loading characteristics in both rotation and tilting, and their massive frames ensure safety at all times. Loading capacity range is 25 000 - 250 000 kg.



PEMA FPS 250000 Megamaster.



Factory testing at PEMA plant FPS 120000.



PEMA positioners commissioned at a customer site.

## Extra large and heavy work-pieces

PEMA FPS 25000 – 250000 Megamaster positioners are designed and manufactured for positioning and rotating/ tilting of extra-large and heavy workpieces in automated welding. Typically, these positioners are used in pressure vessel production, for welding of shipbuilding and offshore industry components, welding and/or cladding of circumferential workpieces, handling of extra heavy cubic frames, etc. Features of FPS positioners are motorized inverters or servo-controlled exact rotation controls and strengthened rotation torque and hydraulic or motorized tilting with the needed adjustments. Loading capacity in the basic FPS range varies between 25 tons and 250 tons. Worktable is equipped with sturdy T-grooves to help clamp the workpieces firmly. Special table designs are also available on request. In every FPS construction, the latest strength calculation programs are utilized to optimize the design and guarantee reliable and safe structures.

Every PEMA positioner model is delivered with a standard remote control unit.



Since FPS positioners are often linked to a welding process where the work-piece movements must be synchronized with a welding head or column & boom, Pemamek offers a complete hard automation solution to fulfill your needs and requirements.

Model:	FPS 25000	FPS 35000	FPS 50000	FPS 80000	FPS 120000	FPS 250000
Max. load (N)	250 000	350 000	500 000	800 000	1 200 000	2 500 000
Rotation speed (rpm)	0,02 - 0,4	0,02 - 0,4	0,01 - 0,2	0,0035 - 0,35	0,0035 - 0,35	0,0035 - 0,35
Max. rotational torque (Nm)	40 000	55 000	75 000	300 000	600 000	1 250 000
Tilting / angle (deg)	hydr. 110	hydr. 110	hydr. 110	hydr. 90	hydr. 90	motor. 90
Tilting torque (Nm)	175 000	280 000	400 000	800 000	1 200 000	2 500 000
Height (mm)	2 500	2 500	2 530	4 110	4 840	5 620
Length (mm)	3 840	3 840	4 200	6 766	7 550	9 020
Width (mm)	1 950	1 950	2 380	2 900	3 670	5 050 (base)

## Titan series

PEMA CPS Titan positioners are designed for heavy and large workpieces with complex geometries. Loading capacities are between 25 and 250 tons.

The main feature of PEMA CPS Titan positioners is their cradle-type architecture. Work-pieces can be positioned to all positions. Both rotation and tilting are motorized.

Model	CPS 25000	CPS 50000	CPS 100000	CPS 250000
Max. load (N)	250 000	500 000	1 000 000	2 500 000

For technical information, contact us.



## Headstock and Tailstock series

PEMA HPS Headstock and PEMA TPS Tailstock positioners are specially designed for long, revolving workpieces. A typical application is the manufacturing of wind towers, vessels, tanks, and other kinds of cylindrical workpieces. Loading capacities range from 3 500 - 40 000 kg.



Photos of PEMA HPS/TPS 7000 positioners.



PEMA HPS/TPS 1500 positioners



PEMA HPS/TPS 7000 positioners

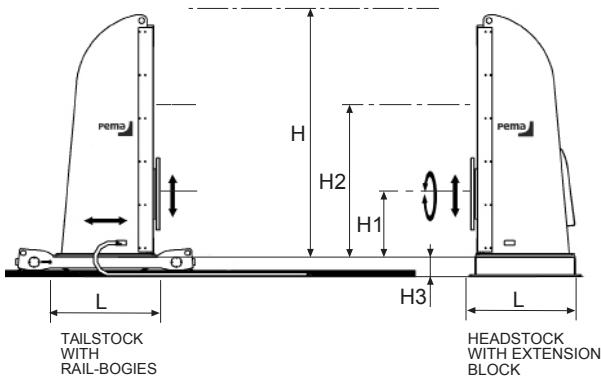
## Handling of elongated objects

PEMA 3500 - 40000 Headstock and Tailstock positioners are specially designed for handling elongated objects. Trailer frames, pipes, or beams are ideal for this type of positioner. For pairs, standard loading capacities range between 7 tons and 80 tons.

PEMA Headstock and Tailstock positioners are efficient and productive for circumferential welding and assembly of difficult and elongated workpieces. Headstocks and Tailstocks are versatile, you can use a Headstock with or without a Tailstock.

Both types come with a step-less, hydraulically operated height adjustment. Tailstocks can have motorized rail car units (R series) for varying lengths of workpieces. When a Tailstock or stud is used with a rail carriage, the Headstock is equipped with a height-extension block.

For wind energy tower assembly and welding, Pemamek manufactures 80 tons and 120 tons Headstock & Tailstock positioners. The wind energy models are equipped with strong hydraulic clamping of shells, longitudinal and vertical movements, and interface for integration with welding equipment.



To obtain more detailed information about Pemamek's engineering solutions specially for wind energy tower and foundation manufacturing, please contact us for further information.

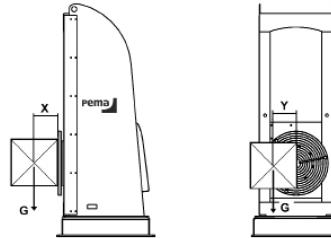
### Load Calculation

Loading torques should always be calculated from the surface of the table plate to the centre of gravity of the work-piece.

When choosing positioners, the torque of the work-piece should be compared with the maximum allowable torque in the appropriate table.

Rotational torque (Nm):  $G \times Y$

Tilting torque (Nm):  $G \times X$



$G$  (N) = weight of work-piece (kg) x gravity factor approx 10 (m/s<sup>2</sup>)  
 $Y$  (m) = distance from the centre of the table plate to work-piece centre of gravity

$X$  (m) = distance from the table plate to work-piece centre of gravity

### Options

- Rail car units for Tailstocks
- Extension blocks for Headstocks
- Stud unit instead of tailstock unit
- Foot pedal for start/stop of rotation
- Foot pedal for speed control
- External control of rotation
- Wireless remote control

Model:	HPS 3500	TPS 3500	HPS 7000	TPS 7000	HPS 15000	TPS 15000	HPS 25000	TPS 25000	HPS 40000	TPS 40000
Max. load (N)	35 000	35 000	70 000	70 000	150 000	150 000	250 000	250 000	400 000	400 000
Rotation speed (rpm)	0,06 - 1,3		0,05 - 1,0		0,04 - 0,75		0,02 - 0,4		0,02 - 0,4	
Max. Rotational torque (Nm)	2 800		9 000		18 000		40 000		55 000	
Max. Tilting torque (Nm)	7 500	7 500	14 000	14 000	70 000	70 000	175 000	175 000	280 000	280 000
Adjustable tilting axle height min-max [H1-H2] (mm)	700-1500	700-1500	850-1650	850-1650	1200-2000	1200-2000	1400-2200	1400-2200	2600-3700	2600-3700
Table plate diameter (mm)	950	950	1 100	1 100	1 490	1 490	1 950	1 950	1 950	1 950
Height [H] (mm)	2 350	2 350	2 500	2 500	3 060	3 060	3 800	3 800	5 200	5 200
Length [L] (mm)	1 050	1 050	1 190	1 190	1 320	1 320	2 200	2 200	2 600	2 600
Width (mm)	1 150	1 150	1 160	1 160	1 490	1 490	2 040	2 040	2 500	2 500
Extension height (H3)	250	250	250	250	300	300				



## Welding and production automation for:

- General fabrication
- Heavy equipment
- Wind energy
- Shipbuilding
- Power generation
- Offshore and process

## About us

Pemamek Ltd., founded in 1970, is a global welding and production automation leader. With extensive 50-year experience in welding and production automation, Pemamek is dedicated to helping heavy fabrication industries, such as shipbuilding, wind energy, and the power generation industry, to raise the level of productivity.

Pemamek is a family-owned limited company with solid finances (AAA-rated company). Today, Pemamek employs 300 personnel at its headquarters and factory in Finland and has local sales offices in the USA, Brazil, Spain, Italy, Germany, and Poland.

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