

# Positioners



# PEMA Positioners

In welding work, positioners are convenient aids in increasing working flexibility, productivity and quality, not to mention labour motivation. The main advantage of positioner utilisation is the fact that work-pieces can always be set up to the best possible downhand welding positions. This way, arc times can be shortened by as much as 70 percent. Welders also appreciate added ergonomic working comfort.

## Extensive range

For effective welding work, PEMA has developed a range of positioner series' which all combine modern design and reliable, efficient technology. In their design, special attention has been paid to safety-at-work and ergonomy. Convenience in use is as

sured by several features such as a light remote control.

PEMA positioner capacities range from 250 kilograms up to a massive 250 tonnes. From this comprehensive selection, every user can find a perfect match to fulfil his requirements.



*When welding is carried out in an ergonomically correct manner, the results are easily noticed in the produced quality.*



## Applications and engineering solutions

PEMA designs and manufactures 50 – 250 ton positioners on request for welding of demanding and heavy work-pieces. For this kind of customised engineering solutions, a 2-axis positioner from PEMA Megamaster series is often the most suitable one. Also, a cradle design from PEMA Titan series can be a good alternative. The welding process can be SAW, Narrow Gap, MIG or Tandem MIG. PEMA also provides matching welding platforms and column & booms to turn the combinations into complete hard automation welding production cells.

Typical applications for heavy positioners include:

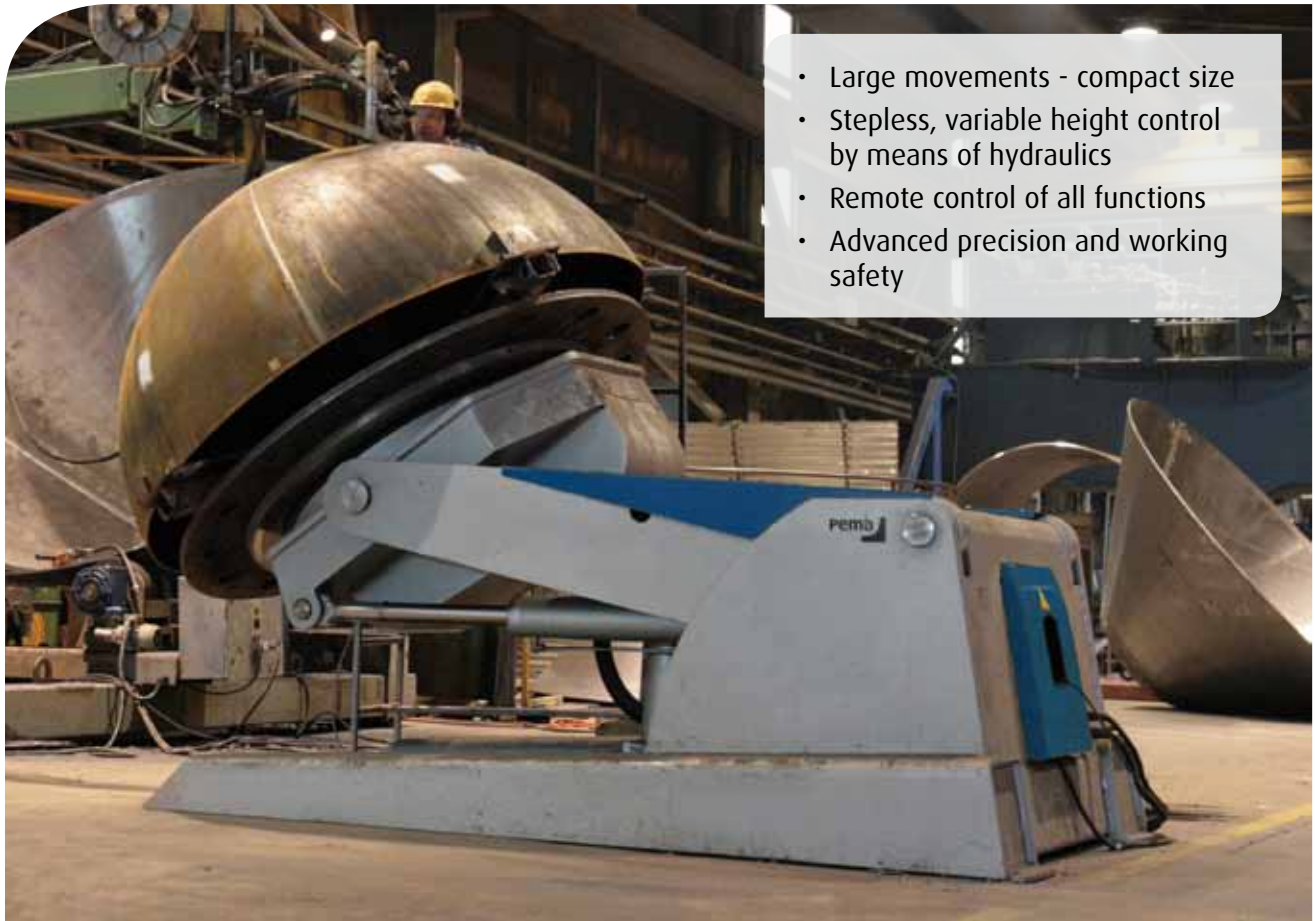
- Automated welding of heavy thick-walled dish ends
- Cladding of pressure vessel components
- Narrow gap and tandem narrow gap welding stations of thick-walled pressure vessels
- Foundations for wind energy plants
- Propeller housings, winches, and other shipbuilding and offshore industry components



*PEMA solutions for mechanised and automatic welding ensure safety, raise quality, and improve work motivation.*

# Skymaster series

PEMA APS 250 - 35 000 Skymaster positioners are, in fact, the best solution to the problem of lifting, rotating and tilting heavy work-pieces with complex geometry. Because the height, angle and rotating speed of the work-piece are fully adjustable, an ideal ergonomic working position can always be guaranteed.



- Large movements - compact size
- Stepless, variable height control by means of hydraulics
- Remote control of all functions
- Advanced precision and working safety

*PEMA APS 15000 Skymaster positioner*



*PEMA APS 1500 Skymaster positioner*



*PEMA APS 750 Skymaster positioner*



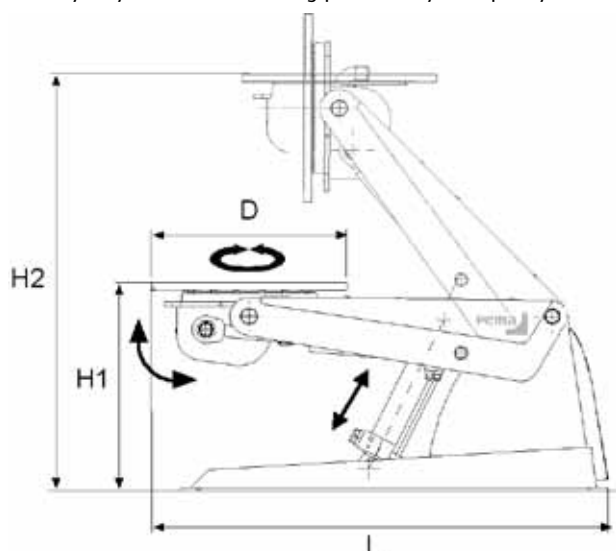
## Ideal partner for any welder

All PEMA APS 250 - 35000 positioners are equipped with adjustable rotation, tilting and height movement functions. Possibility for stepless 3-axis work-piece adjustments guarantees ideal, 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 work-piece into optimum welding and working positions.

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

PEMA positioners are designed in close co-operation with the best professionals. PEMA's extensive experience in designing and manufacturing welding automation solutions has been a key factor in the development of PEMA positioners. The positioners are fundamental tools in every welding shop, and they offer an easy way to increase welding productivity and quality.



### POSITIONER FACTS:

- Fast welding in down-hand positions
- Optimum welding parameters
- Quality improvement - less finishing and repairing
- Accurate, safe and ergonomic

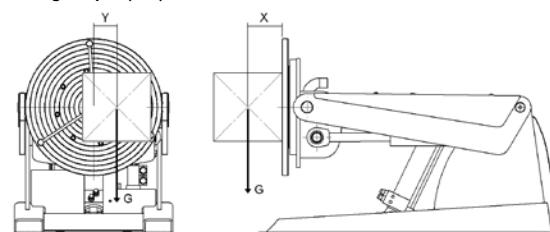
### Load calculation

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 surface of the table plate to work-piece centre of gravity

### Options

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

Model:	APS 250	APS 750	APS 1500	APS 3500	APS 7000	APS 15000	APS 25000	APS 35000
Max. load (N)	2 500	7 500	15 000	35 000	70 000	150 000	250 000	350 000
Rotation speed (rpm)	0,2-4,5	0,09-2	0,07-1,3	0,08-1,6	0,05-1	0,04-0,75	0,02-0,4	0,02-0,4
Max. rotational torque (Nm)	80	600	1 000	2 800	9 000	18 000	40 000	55 000
Tilting / angle (deg)	man 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	70 000	175000	280000
Max.welding current (A)	350	700	700	700	1 400	1 400	2100	2100
Table plate diameter (mm)	400	700	700	950	1 100	1 490	1 950	1 950
Height min-max [H1-H2] (mm)	490-910	720-1450	770-1540	980-1675	1000-1855	1300-2325	1600-2860	2000-3500
Length [L] (mm)	940	1 575	1 640	2 180	2 640	3 150	4000	4750
Width (mm)	570	695	810	1030	1490	1820	1950	2450

## Skyhook series

PEMA SPS Skyhook positioners are built for demanding tasks with heavy work-pieces with even the most complex product geometry. With a Skyhook, work-pieces are easily set up in a wide variety of attitudes. Loading capacity range is 750-10 000 kg.



*PEMA SPS 1500 Skyhook positioner*



*PEMA SPS 5000 Skyhook positioner*



*PEMA SPS 3500 Skyhook positioner*

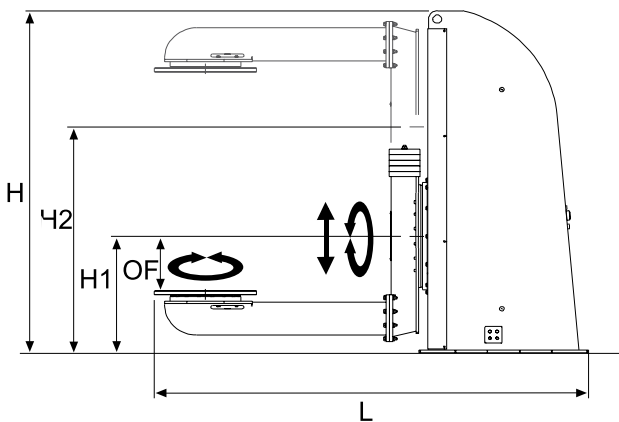
## Heavy work-pieces with demanding product geometry

PEMA SPS 750 - 10000 Skyhook positioners are the right choice heavy work-pieces with demanding product geometry. Typical work-pieces are e.g. tractor cabinets and frame structure parts.

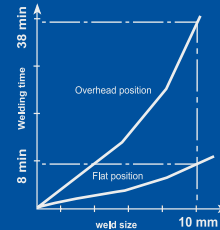
Work-pieces can be adjusted in all conceivable positions with a Skyhook positioner. Usually, they rotate around their centre of gravity. This ensures that the welder's working posture is always productive and ergonomically sound.

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

Every PEMA product utilises high quality components from internationally recognised brands. All structures and components are series produced and tested. Designed to the same high quality standards as PEMA roller beds and column & booms, PEMA positioners fulfil the requirements of the European EN-safety norm. All PEMA positioners come with CE-markings.



**POSITIONER  
CAN SHORTEN  
THE PRODUCTION  
TIME UP TO  
70%!**



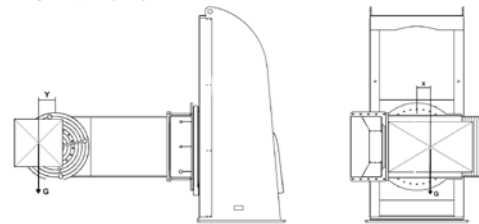
### Load calculation

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

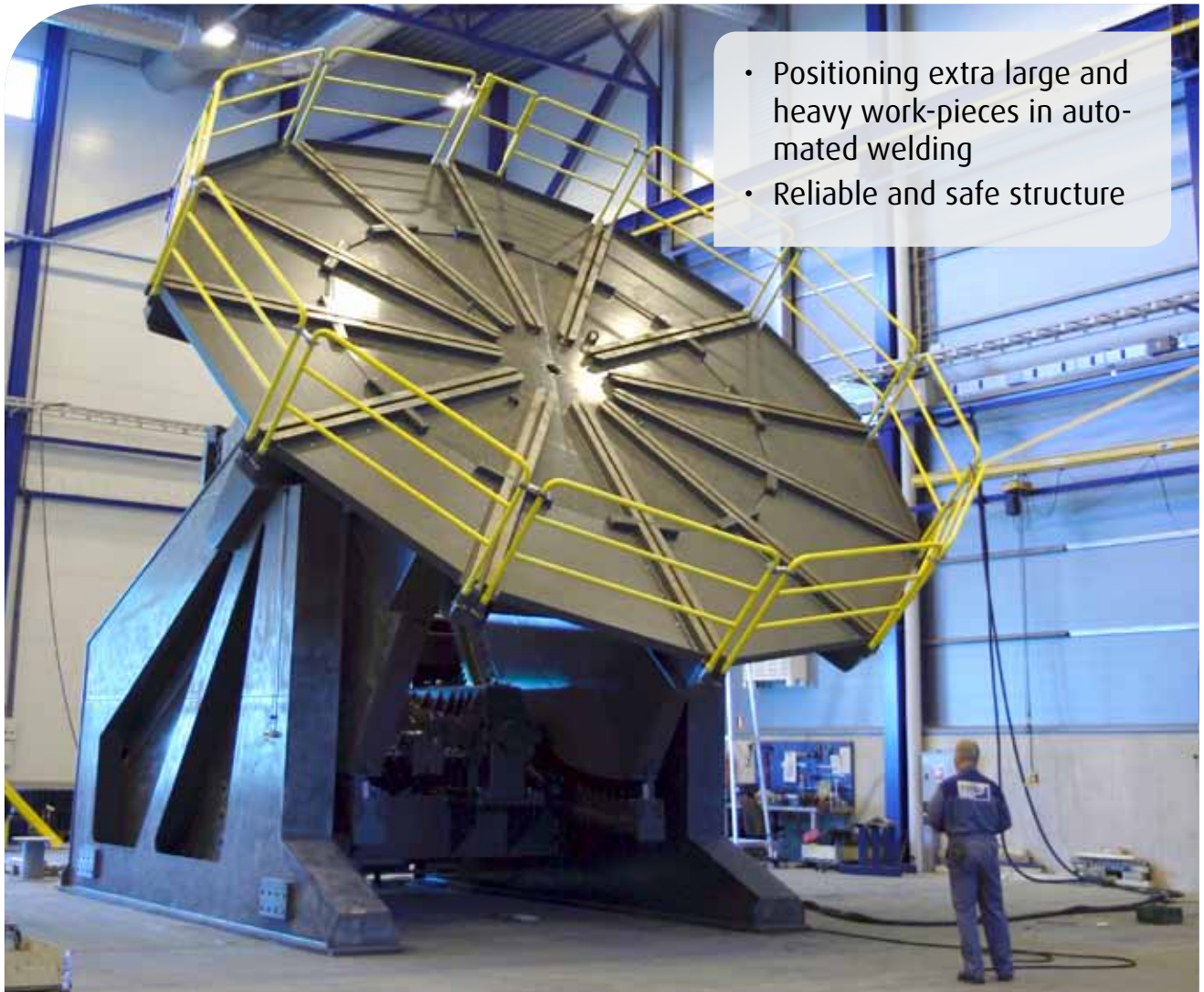
- Foot pedal for start/stop of rotation
- Foot pedal for speed control
- External control of rotation
- Wireless remote control

	Model: SPS 750	SPS 1500	SPS 3500	SPS 5000	SPS 10000
Max load (N)	7 500	15 000	35 000	50 000	100 000
Rotation speed (rpm)	0,09-2,0	0,07-1,3	0,08-1,6	0,05-1	0,04-0,7
Max rotational torque (Nm)	600	1000	2800	6000	18000
Tilting speed (rpm)	0,1-1,5	0,1-1	0,1-0,8	0,1-0,75	0,1-0,7
Max tilting torque (Nm)	1500	3000	6000	10000	20000
Adjust. tilting axle height min-max [H1-H2] (mm)	700 - 1500	850 - 1650	1100-1900	1200 - 2000	1400 - 2200
Offset distance [OF] (mm)	400	400	400	500	500
Table plate diameter (mm)	700	700	950	1 100	1 490
Max welding current (A)	700	700	700	1 400	1 400
Max workpiece diameter (mm)	2000	2400	3000	3 200	4 000
Height [H] (mm)	2 350	2 500	3 060	3 200	3 500
Length [L] (mm)	2 660	2 980	3 680	4 400	5 700
Width (mm)	1 150	1 160	1 450	2 040	2 240



# Megamaster series

PEMA FPS 25000 - 250 000 Megamaster positioners are at their best when large and heavy objects are handled. They offer exceptional loading characteristics in both rotation and tilting, and their massive frames ensure safety at all times.



*PEMA FPS 250000 Megamaster*



*Customer test at PEMA factory*



*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 work-pieces 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 work-pieces, handling of extra heavy cubic frames, etc.

FPS positioners feature 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. Work table is equipped with sturdy T-grooves in order to help clamping the work-pieces firmly. Special table designs are also available on request.

In every FPS construction, latest strength calculation programs are utilised in order to optimise the design and ascertain reliable and safe structures.

PEMA's engineers are able to offer the most suitable solutions for every application. Since FPS positioners are often linked to a welding process where the work-piece movements have to be synchronised with a welding head or a column & boom, PEMA can offer a complete hard automation solution to fulfil your needs and requirements.

Model:	FPS 25000	FPS 35000	FPS 80000	FPS 120000	FPS 250000
Max. load (N)	250 000	350 000	800 000	1 200 000	2 500 000
Rotation speed (rpm)	0,02-0,4	0,02-0,4	0,0035-0,35	0,0035 - 0,35	0,0035 - 0,35
Max. rotational torque (Nm)	40 000	55 000	300 000	600 000	1 250 000
Tilting / angle (deg)	hydr. 110	hydr. 110	hydr. 90	hydr. 90	motor. 90
Tilting torque (Nm)	175 000	280 000	800 000	1 200 000	2 500 000
Height (mm)	2 450	2 550	4 110	4 840	5 620
Length (mm)	3 800	3 800	6 766	7 550	9 020
Width (mm)	1 950	1 950	2 900	3 670	5 050 (base)

## Titan series

PEMA CPS Titan positioners for heavy and large work-pieces with complex geometry. 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 motorised. Work-piece height is fixed.

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 Pemamek



# Headstock and Tailstock series

PEMA HPS Headstock and PEMA TPS Tailstock positioners are specially designed for long, revolving workpieces. Loading capacities range from 3.5 to 40 tonnes.



- PEMA HPS Headstock - motorised rotation & stepless height adjustment
- PEMA TPS Tailstock - freely rotating table plate, adjustable height
- Well suited for handling elongated objects
- Versatility: Headstock can be used either with or without the Tailstock

*PEMA HPS/TPS 40 000 positioners, a special heavy-duty application for wind energy plant tower production*



*Pema HPS/TPS 1500 positioners*



*Pema HPS/TPS 15 000 positioners*



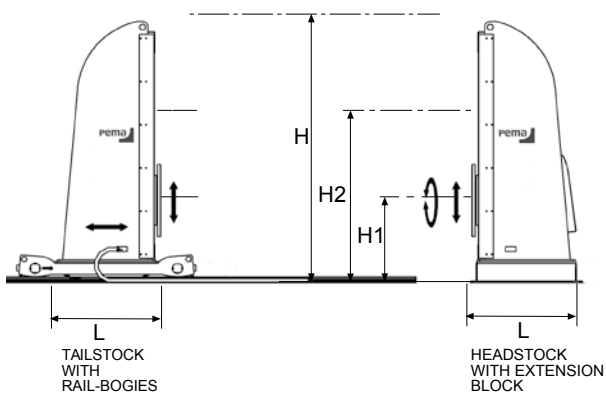
## Handling of elongated objects

PEMA 3500 - 40000 Headstock and Tailstock positioners are specially designed for handling of elongated objects. Trailer frames, pipes or beams are ideal this type of positioners. 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 work-pieces. Headstocks and Tailstocks are versatile, you can use a Headstock with or without a Tailstock.

Both types come with stepless, hydraulically-operated height adjustment. Tailstocks can have motorised rail car units (R-serie) for varying lengths of work-pieces. When a Tailstock is used with a rail carriage, the Headstock is equipped with a height-extension block.

For wind energy tower assembly and welding, PEMA 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 PEMA's engineering solutions specially for wind energy tower manufacturing, please see brochure "PEMA Welding automation for wind energy tower manufacturing".

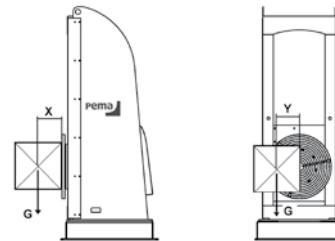
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**Rotational torque (Nm):**  $G \times Y$

**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 tilting axle to work-piece centre of gravity

### Options

- Rail car units for Tailstocks
- Extension blocks for Headstocks
- 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)	0,08-1,6		0,05-1		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	1100-1900	1100-1900	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



## PEMA welding automation – Sparking your business

PEMA welding automation comes from Pemamek Oy Ltd, the world's leading specialist in designing and manufacturing welding mechanisation and automation systems, and work-piece handling equipment. Pemamek uses and produces high technology. Utilising the best available robot and automation technology, every PEMA product and system is uncompromisingly designed to improve customer competitiveness and productivity. Established in 1970, Pemamek has constantly strived to supply the best welding automation solutions in the world.

## PEMA systems and comprehensive customer support services are specifically engineered for the following industries:

- Heavy engineering
- Mobile machinery
- Civil construction
- Shipbuilding and offshore
- Industrial boilers
- Wind energy
- Process and nuclear

PEMA products and services are used in more than 50 countries around the world.