



sarens
group

www.sarens.com

SARTOWER LIFTING SYSTEM

4000 TON



nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

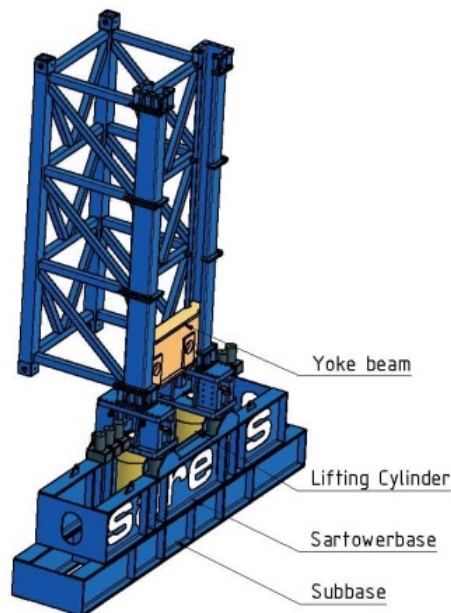
Specifications
Kennzeichen

General

The SARENS PUSH UP lifting system is developed as an alternative lifting system towards the actual high capacity lifting devices such as cranes. The system is used for lifting projects where the requirements cannot be fulfilled with the cranes. This requirement can be environmental and/or lifting height and/or lifting capacity.

The SARENS PUSH UP has following main features

- Lifting operation 100% controlled from ground level
- No mechanical, electrical, hydraulic and electronical parts above the base level which means no operators are needed in the lifting towers during a lifting operation
- High capacity for a compact construction
- Built up out of standard elements which fastens up and facilitates erection
- Capable of working with 2 / 4 / 6 ... lifting towers and all centrally controlled
- Very easy mobilisation due to the containerised dimensions



nothing too heavy, nothing too high



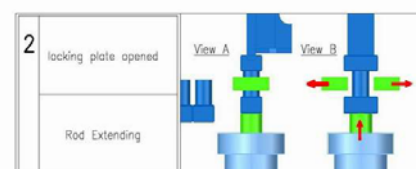
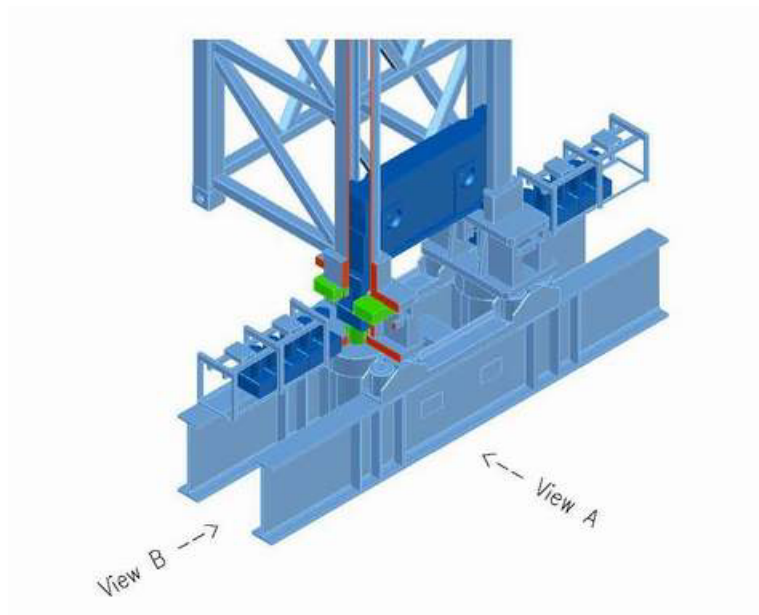
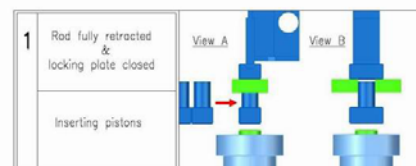
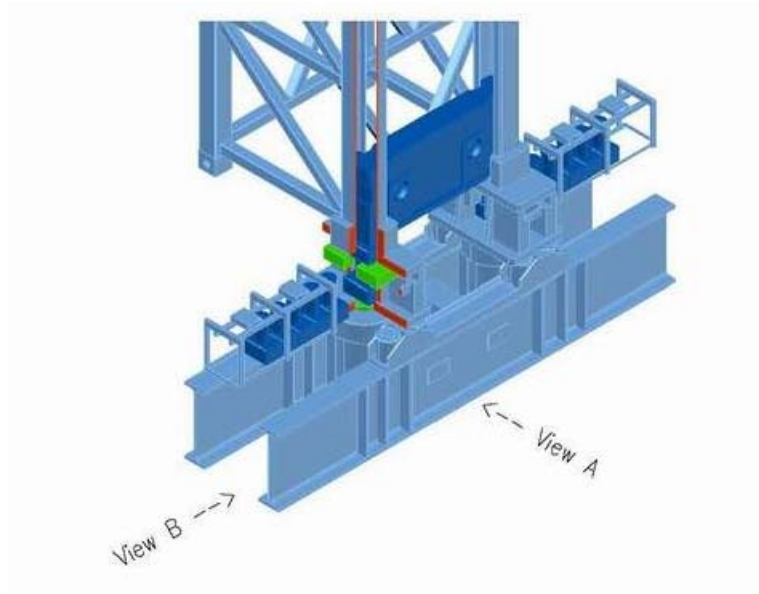
SARTOWER

**Kenmerken
Caracteristiques**

4000TON

**Specifications
Kennzeichen**

Working principle



nothing too heavy, nothing too high

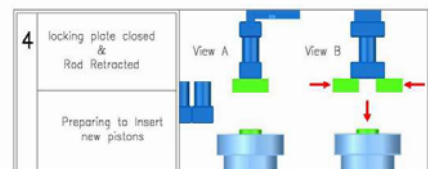
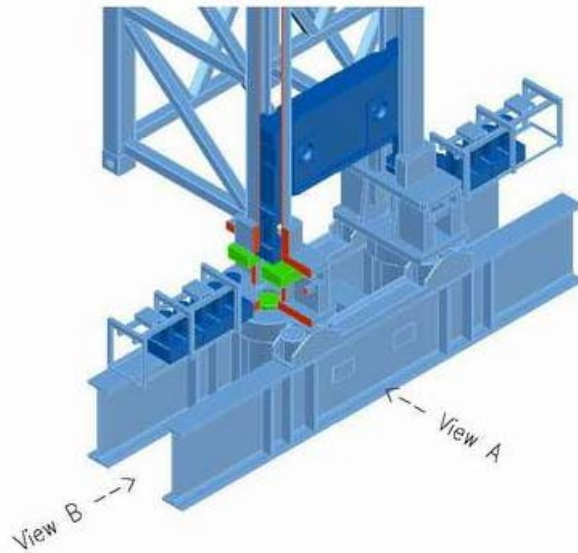
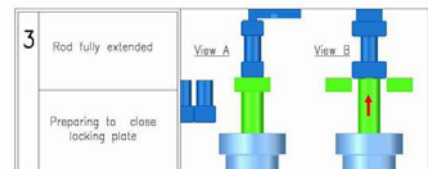
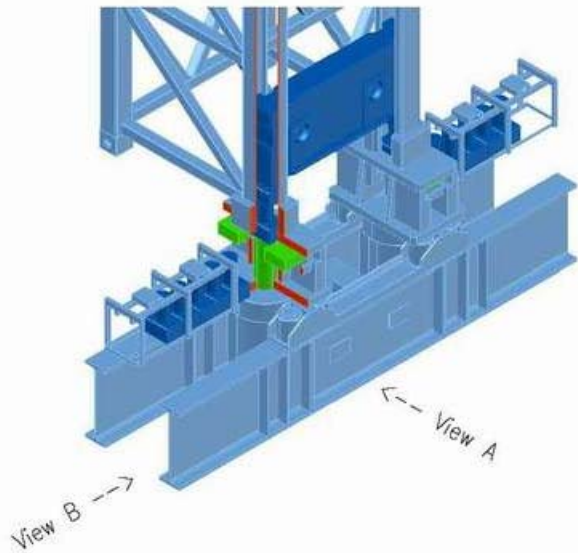


SARTOWER

**Kenmerken
Caracteristiques**

4000TON

**Specifications
Kennzeichen**



nothing too heavy, nothing too high



SARTOWER

**Kenmerken
Caracteristiques**

4000TON

**Specifications
Kennzeichen**

Capacity

Each base (bottom part tower) is dimensioned for a 1000 SWL. This means a pair of two towers does have a lifting capacity of 2000 tonnes.

Each lifting operation needs to be carefully engineered in relation to tower height, bracings and/or stay wires and environmental conditions in order to determine the actual lifting capacity of the system. The capacity is function of the horizontal loading (both transversal and longitudinal) in the lifting towers.

Example of capacities (not to use for comparison):

- For a set of two 100 m high lifting towers which are stayed / braced in the top in both longitudinal and transversal direction a load with a wind surface of 1000 m² (for example a reactor vessel with 12,5 m Ø and a length 80 m) and weight of 850 tonnes can be lifted. The capacity can be increased by installation of additional braces/stays in intermediate levels
- For a set of two 75 m high lifting towers which are stayed / braced in the top in both longitudinal and transversal direction a load with a wind surface of 800 m² and weight of 1200 tonnes can be lifted.





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

Detailed description SARTOWER

The SARTOWER is built up out of following main parts :

- Base built up out of 2 HEB1000 beams and equipped with the main lifting cylinders and equalising jacks
- Tower elements 2,4 x 2,4 x 6m (masts)
- Pistons
- Yoke
- Hydraulic system
- Electronic control system
- Stay wires and bracings

Sartower base

The base is built up out of 2x HEB1000 of 6 m length. As all vertical load due to the lifted object is concentrated in the pistons – guide in the front panel of the towers is the base centred underneath the guide / lifting pistons. To transfer the load from the lifting cylinders towards the HEB1000 beams the equalising jacks are installed to eliminate the effects of local settlements and deformations and an equal load spreading is created . The HEB1000 beams are locally stiffed / reinforced to handle the maximum load of 500 tonnes per lifting jack.



nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

Tower elements (masts)

The dimensions of the tower elements are 6,050 x 2,450 x 2,6 m. During assembly the tower elements are assembled on top of each other and connected by means of a bolt connection in the front panel and a bolt or pin connection in the back panel.



A mast of 6050 mm is built up out of 4 vertical members which are braced by means of diagonals and K bracings. The back panel vertical members are RHS 250 x 12,5 sections and the front panel vertical are the piston guides. All diagonals and braces are RHS profiles.

- Diagonals : RHS 120 x 5
- Horizontals : RHS 140 x 6,3

Working platforms and cage ladders are installed in each tower sections so no external equipment is needed to make to interconnection of the lifting towers mast sections.

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichnen

Blocking pistons

The pistons are massive blocks which are inserted progressively one after the other and stacked on top of each other during a lifting operation (the load is pushed up by these blocks). Each lifting piston has a height 500 mm with very small tolerances. The pistons are stored in a frame which is easy picked up with a forklift.



nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

Yoke beam

The yoke beam is a small lifting beam that is supported at both ends by the pistons and located in the guide.

The yoke beam is a box girder capable of handling point loads of 1000 tonnes.



Hydraulic system

The hydraulic system is installed in the base and the powerpacks. The powerpacks are equipped with all components to provide the hydraulic power and the base has all elements related to the lifting, equalising jacks and feeding of pistons.

- **Hose and pipes:**

All the hydraulic hoses in the system are made out of reinforced rubber and capable of handling the system working pressure within the required safety margins. The overall hydraulic system is approved and tested by the supplier.

- **Lifting cylinders (2 in each base):**

The lifting cylinders have a stroke of 565 mm and a capacity of 500 tonnes at a pressure of 275 bar.

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

- **Equalising jacks (8 in each base):**

The equalising jacks are standard single action Enerpac jacks with a capacity of 250 tonnes at 700 bar – when the towers are maximally loaded (1000 tonnes) the pressure in these jacks is maximal 350 bar

- **Powerpack (HPU):**

On Each Sartower a powerpack is built up around the hydraulic tank and features all 4 pumps of the lifting system. The required EL power is 2x 125 Amp – 50 Hz 380/400 V. The main system working pressure is 350 Bar. On the powerpack. Each HPU contains a control cabinet containing a PLC (refer to §4.6). All powerpacks are interchangeable during operation.





SARTOWER

Kenmerken
Caracteristiques

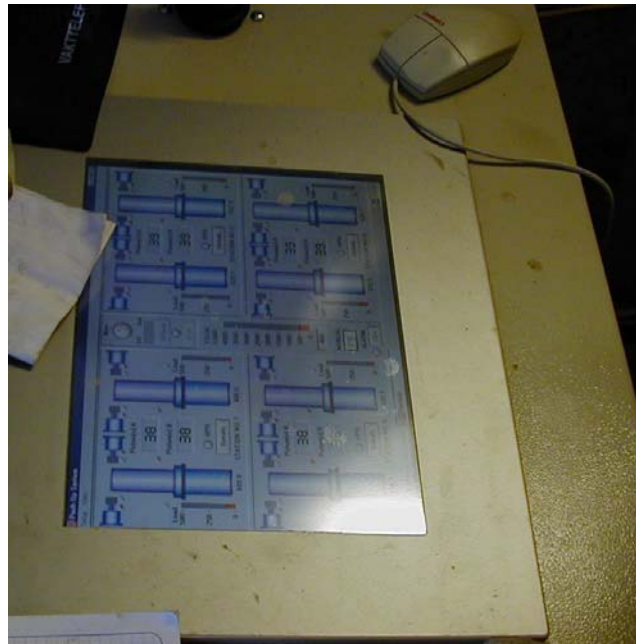
4000TON

Specifications
Kennzeichen

Control system

The control system is integrated in each base. The bases are interconnected by means of a data communication cable. The operation is controlled by the master PLC and following information is represented on the screen of the master PLC during the lifting operation:

- Lifting height
- Load in each lifting cylinder
- Piston installation
- Position of locking plates



System stay wires / bracings

A system of bracings and/or stay wires is used to stabilise the towers. The bracings / stays can be connected to the specially constructed stay frames which can be installed in between two mast sections.

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichnen

REFERENCE PROJECTS :

Grane Project – Lifting Module D30 :



The D30 module (height 80 m – 1400 tonnes) is lifted by the SARTOWER up to a height of 22 m and skidded on top of the D40 module.

- Lifting height = 22 m
- Lifted weight = 1400 t + lifting beams 180 t
- Environmental conditions
 - Lifting : 10 m/s
 - Stop : 23 m/s
 - Erecting: 45 m/s

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

Grane Project – Lifting Module D10 :



Four towers of the SARTOWER are used to lift the upper part of module D10 of the GRANE project. The lifted weight is around 1500 tonnes and the module is lifted to a height of 44 m to facilitate installation of the bottom part by means of our hydraulic trailers.

- Lifting height = 44 m
- Lifted weight = 1545 t + lifting beams 150 t
- Environmental conditions
 - Lifting : 10 m/s
 - Stop : 23 m/s
 - Erecting: 45 m/s

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichnen

Hundhammerfjellet project - lifting of a 3MW windturbine



- Lifting height = 90 m
- Lifted weight = 560 t + lifting beams 100 t
- Environmental conditions
 - Lifting : 15 m/s
 - Stop : 32 m/s
 - Erecting: 56 m/s

nothing too heavy, nothing too high





SARTOWER

Kenmerken
Caracteristiques

4000TON

Specifications
Kennzeichen

Technip DHC Reactor lift – Gonfreville



- Lifting height = 0 - 50 m
 - Lifted weight = 1400 t
 - Environmental conditions
- Lifting : 20 m/s

nothing too heavy, nothing too high





SARTOWER

**Kenmerken
Caracteristiques**

4000TON

**Specifications
Kennzeichnen**

Milau project : lifting columns for the Milau viaduct in France (Bridge over river Tarn between Béziers and Clermont-Ferrand)

Weight : 700 tonnes each – height 86.00 m

Client : Eiffel

Period : June 2004 – August 2004

