

EQUIPMENT DATA SHEET – Telescopic Lifting Gantry 1000t (TLG1000)

The TLG1000 is a telescopic lifting gantry with a capacity of 1,000t. The system is specifically designed to offer a lifting solution for complex lifting operations. Due to its smart and compact design, the TLG1000 system is able to work in confined areas where other cranes with a similar capacity are unable to work.

The TLG1000 system consists of four towers. These towers are supported on wheels that run on track sections. These tracks are placed parallel of each other and are connected at regular intervals. Each TLG1000 tower has two jacking cylinders which can be retracted or extended to lift or lower the load. Besides these cylinders, each tower is self-propelled and has its own integrated drive system which allows for horizontal movement in the longitudinal direction of the tracks.

Two towers are connected by the header beam on top of the towers, creating a portal. The header beam has multiple connections for walkways and scaffolding on both sides to ensure safe working environment. Usually the hang plates (also called lift links) or the wire rope skids are placed on top of this beam. These support the slings attached to the load, but it is also possible to place other beams on top of the header beam to connect the two portals. The TLG1000 system also consists of multiple push-pull units which are positioned on top of the header beam. These push-pull units allow for transversal movement of the load by side shifting.



Figure 1 – TLG1000 system during load test



Figure 2 – Hang plate on top of the header beam



Figure 3 – Wire rope skid on top of the header beam

The TLG1000 system has a variable lifting height with a maximum height of 11,710 mm. This height is reached in three stages. Compared to traditional telescopic lifting gantries, the TLG1000 system has a major advantage. The capacity of these traditional gantries will decrease at every stage, however, the 1,000t capacity of the TLG1000 system will remain at every stage due to the use of a single stroke jack. These jacks are less vulnerable than telescopic jacks. Another major advantage is the side load

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capacity compared to traditional telescopic lifting gantries. Due to its smart design, the TLG1000 system is able to withstand a side load up to 5.85% of the payload, depending on the soil stiffness and the soil conditions. This relatively high side load is the result of a wide base in two directions and the partially fixed connection between the tower and the header beam. This partially fixed connection eliminates the need for stabilizer bars, which allows for a larger size of the load inside the gantry.

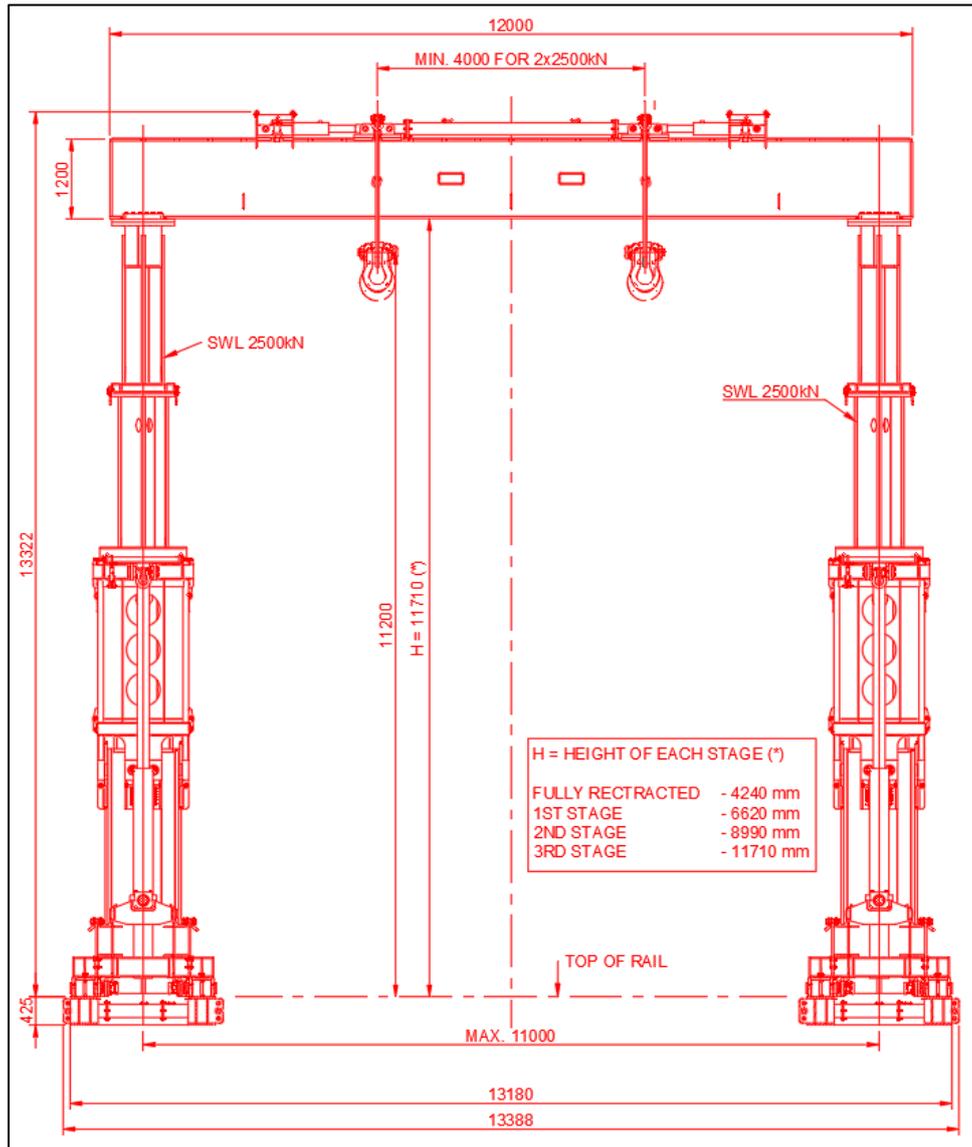


Figure 4 – Fully extended TLG1000 (max stage 3)

The TLG1000 system has two configurations regarding the width of the base in transversal direction of the tracks: A wide configuration for more stability and a narrow configuration for lifting operations in confined areas. This narrow configuration is designed in accordance with the '915' tracks, which are widely used in the industry. These wide and narrow configurations also offer a hybrid solution, with the tracks in the wide configuration on one side, and the tracks in the narrow configuration on the other side of the portal.

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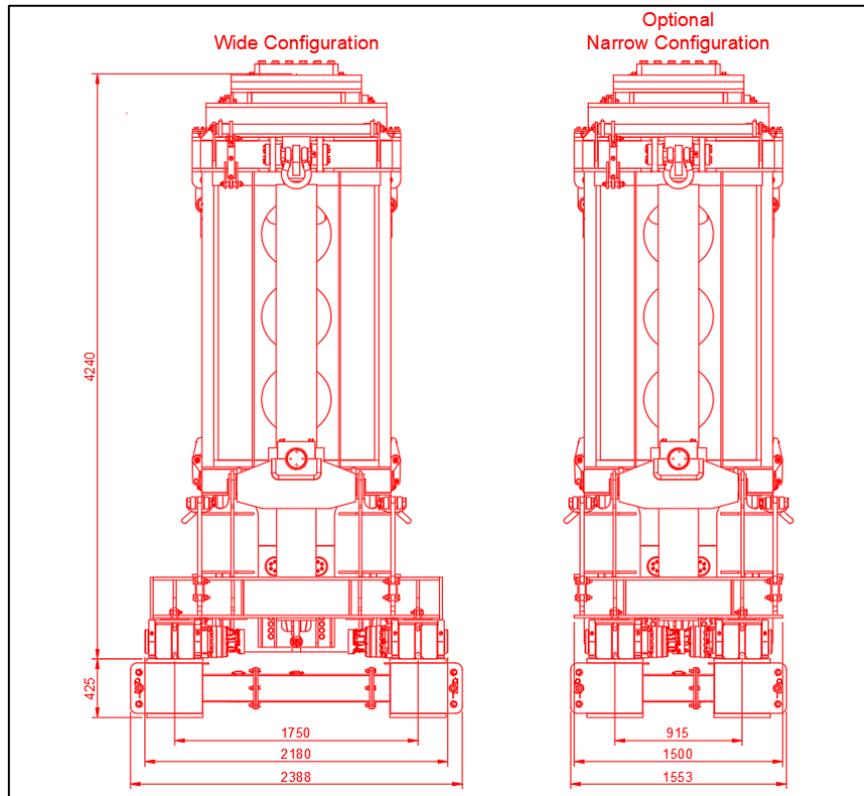


Figure 5 – TLG1000 configurations

Besides the relatively high side load up to 5.85% of the payload and the 1000t capacity for each stage, the TLG1000 system consists of a containerised design. This containerised design allows for fast and easy transportation of the total system. By using only one crane and the supplied auxiliary equipment, it is possible to assemble the TLG1000 system quickly and easily. This is the case for assembly even within a confined area, such as inside a building.

The TLG1000 system consists of a 'plug and play' principle, because the only thing left to do after assembly of the system is to plug in the data cables between the towers and connecting each tower to the electric power source (400VAC; 125A; 50Hz) and the system is ready for lifting operations.

The TLG1000 system is primarily controlled from a wireless remote which enables synchronized lifting and driving of the four towers at the same time, this results in near equal movement of the TLG1000 towers. However, individual control of a tower is also possible with the wireless remote or with the hand wired remote supplied with each tower. The control system also has the ability to be zeroed or calibrated at the beginning of a lift. Finally, the control system allows the TLG1000 system to reach different speeds depending on the magnitude of the load. Therefore, the lifting and driving speeds for one TLG1000 tower can be divided in three categories:

- Unloaded: for load of 0t-100t
- Light load: for load of 100t-200t
- Heavy load: for load of 200t or more

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Key features of the TLG1000 system include:

- Stage locks: The stage locks are designed to connect or disconnect two sleeves by locking or unlocking the four pins.
- Sleeve locks: The sleeve locks are designed to pick up a sleeve to extend or retract it to another stage.
- Safety locks: The safety locks are a safety system that automatically holds the load in case of hydraulic failure of the lift cylinders.
- Header beam tower connection: The connection between the header beam and the TLG1000 tower is a partially fixed connection which allows for small inclinations due to the deformation of the header beam, and provides extra stability to avoid tipping over.
- Telescopic boom: The telescopic boom sections are manufactured with maximum strength and minimum deflections. Due to the smart design of the boom sections, side load will be transmitted through the telescopic boom section instead of the lift cylinders.
- Self-propelled system: The TLG1000 towers are fitted with hydraulic drive motors. The hydraulic drive motors allow for direct drive and braking to the loaded wheels and provides the option of free-wheeling. This free-wheeling option makes the TLG1000 system also suitable for tailing operations. Another advantage of these hydraulic drive motors is the stepless acceleration and deceleration to the maximum and minimum speed.
- Push-pull units: The push-pull units on top of the header beam are equipped with cylinders. These cylinders have a stroke of 540 mm to side shift the load transversally. In the longitudinal direction of the header beam, these push-pull units are locked by pins. These pins can be locked and unlocked manually to allow an even larger transversal movement of the load.
- Lift cylinders: Each tower is fitted with two lifting cylinders which provide the vertical movement of the load. A major advantage of the design of the TLG1000 towers is that these cylinders can be exchanged, even when the towers are still loaded.
- Hydraulic piston pump: The hydraulic piston pumps provide a variable flow and pressure for optimal power use.



Figure 6 – TLG1000 tower



Figure 7 – Stages of a TLG1000 tower

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Electronic monitoring system

The TLG1000 system is fitted with an electronic monitoring system which is similar to a load moment indicator of a crane. This monitoring system provides the operator with real time and accurate information of the position and condition of the load and allows for a rapid response to correct an uneven or skewing load. The electronic monitoring system consists of the following features:

- Extra monitor on each tower: Each tower is fitted with a monitor that provides real-time and accurate information of that specific tower and the system. For example, which hydraulic valve is enabled. This information assists and accelerates troubleshooting when the system malfunctions or when defects occur.
- Inclinometers: The inclinometers provide the operator with real time and accurate info of the inclination at the top and the bottom of the TLG1000 towers for the X and Y direction.
- Digital stroke display: The digital stroke display shows the stroke of each tower in millimetres.
- Digital load display: The digital load display shows the load lifted in each tower and provides the operator with the total load lifted by the TLG1000 system.
- Driving and lifting speed: The control system provides the operator with the driving speed and the lifting speed on the wireless remote.
- Stroke control: The control system measures and automatically adjusts the deviations in strokes between the towers during vertical movement. This way, the load is kept level within the allowable margins. However, the electronic monitoring system of the TLG1000 also allows for the two portals to be operated with an uneven stroke in relation to each other.



Figure 8 – TLG1000 system fully extended