



LIBERA

USER'S MANUAL



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This user manual refers to the product "Libera" manufactured by the company Litec s.r.l. of Marcon (Venice - Italy).

Litec products are identified by the presence of a self-sticking label on all manufactured parts, as illustrated above.



1. Introduction.

Thank you for having selected a Litec structure.

The aim of this assembly manual is to describe the principal assembly phases, and the operational set-up of the entire structure. The supporting designs which accompany the text, illustrate the various installation phases. In the case that any sections are not clear, we suggest that you contact our Technical Office.

The hoisting equipment is not considered in this manual, since it is not furnished by Litec. Concerning this equipment, we attest and certify to what is reported in the instructions which accompany that equipment

2. The structure.

Libera is a structure composed of flat FL76 trusses. It is based on a truly innovative concept, with a special modular truss for the sliding of fabric, which combined together with the trusses of the same group, allow for the creation of a "space frame structure" of any dimension.

The special screw couplers and the "gates", allow for doubling of the load bearing truss where particular carrying loads require this.

Planned for various uses and for the hanging on of various elements, it is suitable for positioning to fixed structures. Hoisted up with a multidirectional type framework system (fig. 1), it combines with and integrates perfectly well with the Litec MT52, MT40 and Varitower 40 hoisting towers (fig. 2).

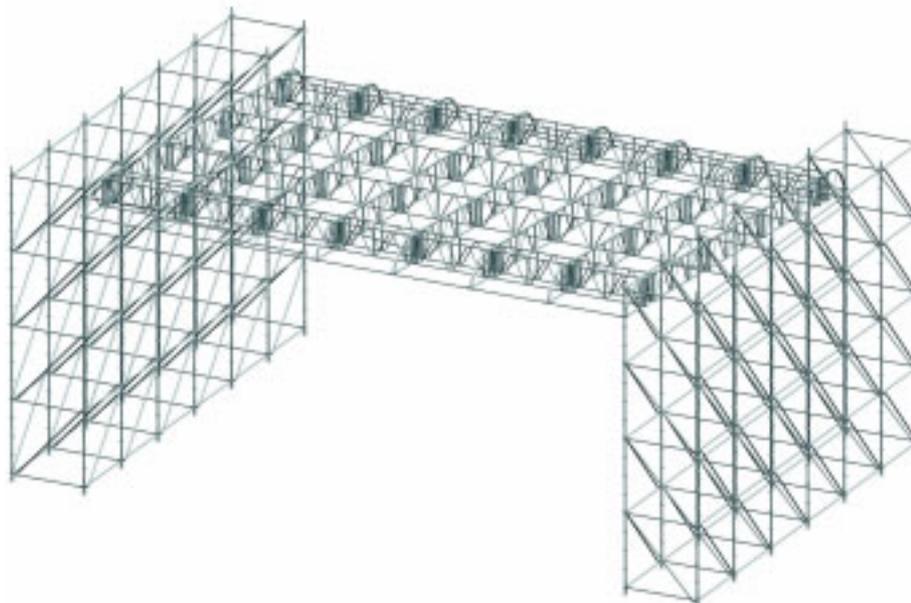


Fig. 1

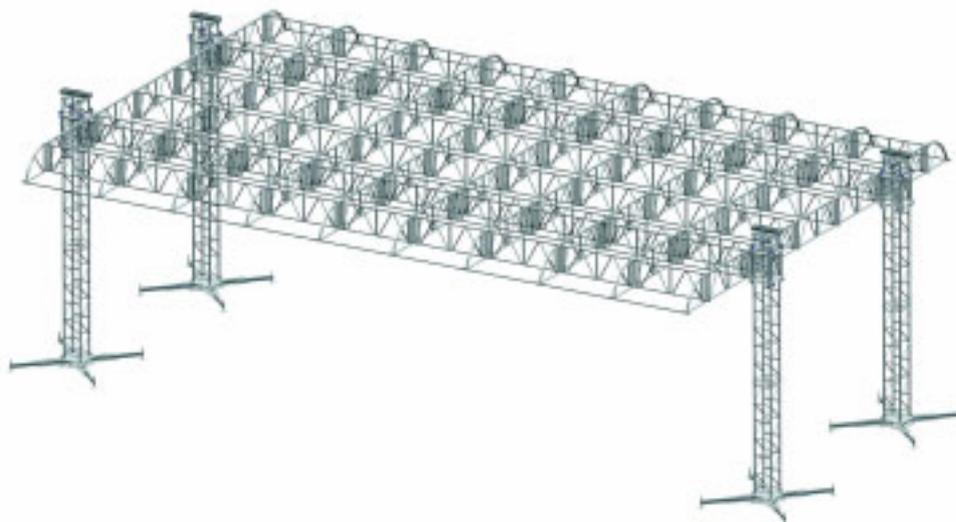


Fig. 2

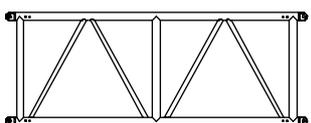
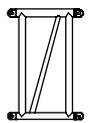
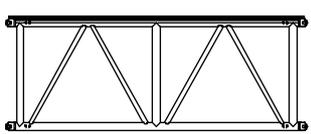
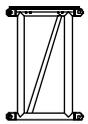
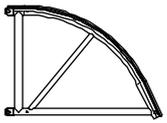
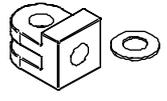
Libera is assembled in a very short time. It was conceived, in order to support high loads and to occupy a very reduced volume.

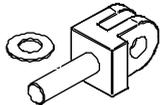
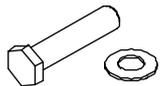
The maximum single extension span of the front, allowed for by this structure is 24 meters. The applicable loads vary according to the way in which the structure itself is formed and according to the number of hoisting towers.

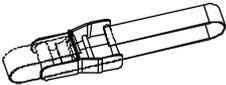
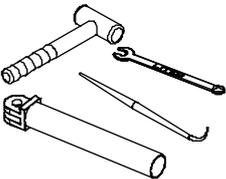
It is absolutely essential to consult a qualified technical expert for the definition and configuration of the structure, and for the arrangement of loads and anchoring points.

Further information is available upon request at our Technical Office.

3. Component elements.

Disegno	Codice	Descrizione	Peso [Kg]
	FL76300V	Ladder truss 76 cm x 300 cm	24,6
	FL76200V	Ladder truss 76 cm x 200 cm	17,4
	FL76100V	Ladder truss 76 cm x 100 cm	-
	FL76047V	Ladder truss 76 cm x 47 cm	9,4
	FL76300R	Ladder truss 76 cm x 300 cm with canopy rail	25,7
	FL76200R	Ladder truss 76 cm x 200 cm with canopy rail	18,8
	FL76100R	Ladder truss 76 cm x 100 cm with canopy rail	-
	FL76047R	Reticular truss 76 cm x 47 cm with canopy rail	10,8
	FL76111RH	Front / rear curved section with canopy rail	8,9
	KHLF	Fork connectors with M20 screw nuts + conical spring washer	0,7

Disegno	Codice	Descrizione	Peso [Kg]
	KHLM	Fork connectors with M20 screw bolt + conical spring washer	0,9
	KHLP	Ø20 mm Cylindrical pin + 3 mm safety pin	0,2
	KHL D	M20 screw nut + conical spring washer	0,1
	KHLB	M20 screw bolt + conical spring washer	0,2
	RAF300 RAF200 RAF047	Canopy tension tube - 300 cm Canopy tension tube - 200 cm Canopy tension tube - 47 cm	7,7 5,4 1,9
	RAH414M1 RAH348M6 RAH289M3 RAH352M7 RAH272M5 RAH191M4 RAH047 RAH200 RAH300	Diagonal brace - 300 cm x 300 cm Diagonal brace - 300 cm x 200 cm Diagonal brace - 300 cm x 047 cm Diagonal brace - 200 cm x 300 cm Diagonal brace - 200 cm x 200 cm Diagonal brace - 200 cm x 0.47 cm Reinforce transom - 47 cm Reinforce transom - 200 cm Reinforce transom - 300 cm	5,6 4,8 4,1 4,9 3,9 3,0 - - -
	HSC	Covering canopy (provided in strips)	650 g/m2
	RAL300 RAL200 RAL047	Tube for canopy tension – 300 cm Tube for canopy tension – 200 cm Tube for canopy tension – 47 cm	6,3 4,2 1,0

Disegno	Codice	Descrizione	Peso [Kg]
	HRAT	Belt ratchet	-
	KHLG	M20 eye-bolt	0,4
	TZHL01	Libera assembly Kit: <ul style="list-style-type: none">- one plastic Ø40 mm hammer- one wrench with fork end- one lever- one 30 mm spanner	-

4. Site safety conditions.

We recommend to respect the following safety conditions during assembly and dismantling of the structure:

- Skilled specialised workers, certified as having the necessary physical qualifications for the activity must be employed.
- Suitable and appropriate Individual safety elements must be employed: safety belts, helmets, gloves, safety boots, etc., as specified in the safety plan.
- For each team, the responsibilities and the tasks concerning the management and conduction of the work must be well defined.
- Climbing up on the structure by personnel without the appropriate and suitable equipment must be strictly forbidden.
- Non-authorized personnel must be strictly forbidden from entering the assembly/dismantling site area, by using a suitable enclosure fence, together with obligatory identification signs.
- Signs which indicate the risks and the precautions to be followed must be in place.
- Circulation practicality must be assured for personnel and for traffic vehicles during execution of the work.
- All construction elements must be checked before use, and if necessary all non-suitable items must be eliminated.
- It is absolutely necessary to periodically check the anchoring points, the tightness and closure of the screw nuts, the state of the joint connections, and all the structural elements, especially after heavy adverse weather conditions.
- No modification whatsoever must be made to the originally designed structure without the authorisation of the designer.
- It is necessary to assure that the executive designs, the necessary permission documents, and the safety plans to be referred to in every eventuality not specifically cited, are present at the work site.

5. Assembly instructions.

For the assembly of the space frame we advise the use of the Libera assembly kit, or other similar equipment.

For the assembly of the space frame, joints between trusses oriented in one direction are made in a different manner than those between trusses oriented orthogonally to them.

For the connection of trusses oriented in one direction, proceed as follows:

1. Connect the forked ends of the two trusses, by first aligning the holes prepared for the insertion of the screw bolt connectors.
2. Then insert the screw bolt connector with an elastic washer.
3. Insert a second washer and then screw the connector to the screw nut connector until the forked ends of the connectors are oriented in the direction illustrated in figure 3.

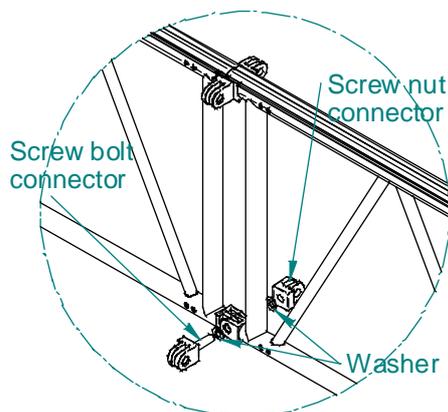


Fig. 3

For assembly of trusses oriented orthogonally to the unidirectional trusses, use only pins and safety pins:

1. Connect the forked ends of the orthogonally directed trusses as illustrated in figure 4. Whenever you have difficulty with this insertion procedure, check that the directional arrangement and the alignment of the forks is correct.
2. The truss is fixed with two pins and two safety pins.

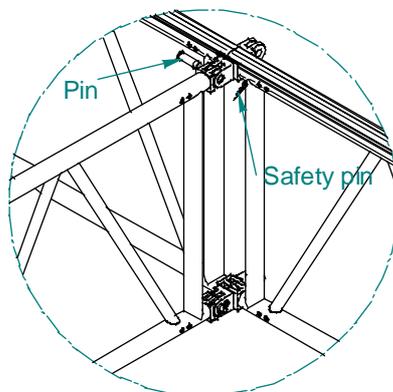


Fig. 4

At the suggestion of the designer, diagonal elements are positioned on certain frames in order to maintain the trusses in a squared alignment.

For the assembly of these elements proceed as follows:

1. Open both self-locking hook clamps on the diagonal element, by pressing down on the handle.
2. Position the diagonal element as illustrated in figure 5.

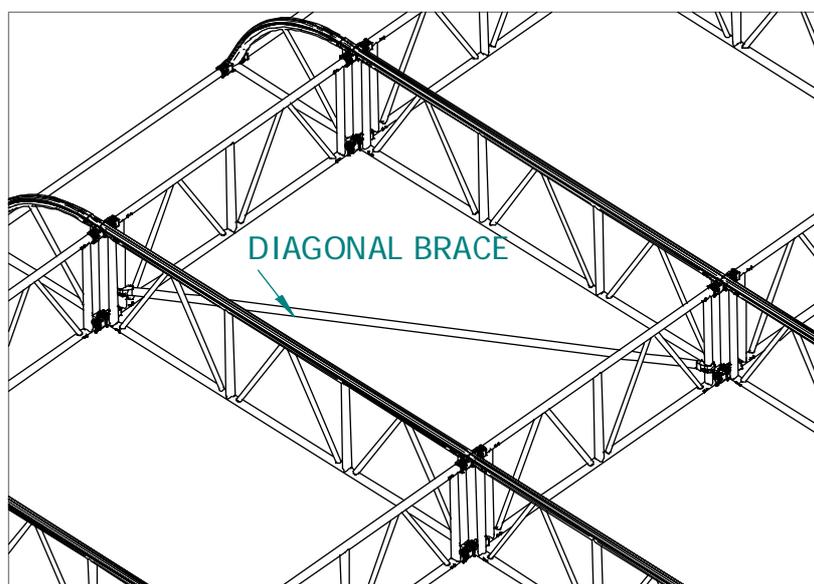


Fig. 5

3. Put pressure on the back of both of the clamping hooks until you hear a closing click.

6. Libera assembling like composite truss.

Libera system's elements allow you to assembly a composite truss with rectangular section 76 cm x 52 cm.

To build up the truss, it suggests to operate as follow:

1. place a 47 cm gate (figure 15).
2. assembly the two forks female and one male as presented on picture 16.

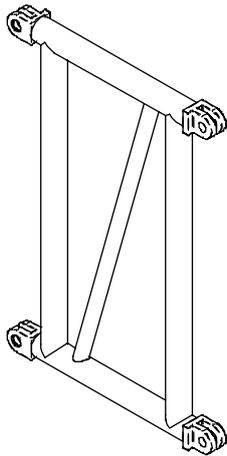


Fig. 15

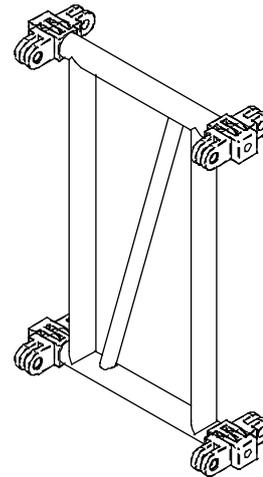


Fig.16

3. connect two Libera flat units, according to the draw (fig. 17).

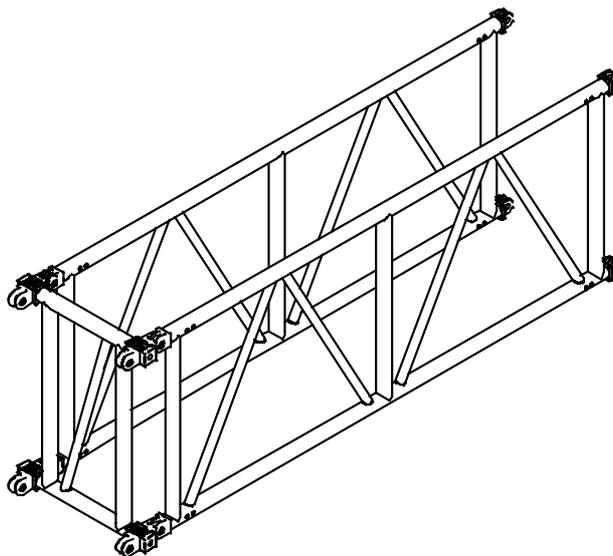


Fig. 17

4. Complete the Libera module using a 47 cm gate (fig. 17).
5. fix the forks by cylindrical pins and safety pins and put a diagonal brace with click hands (RAH191M4) as shown on figure 18.

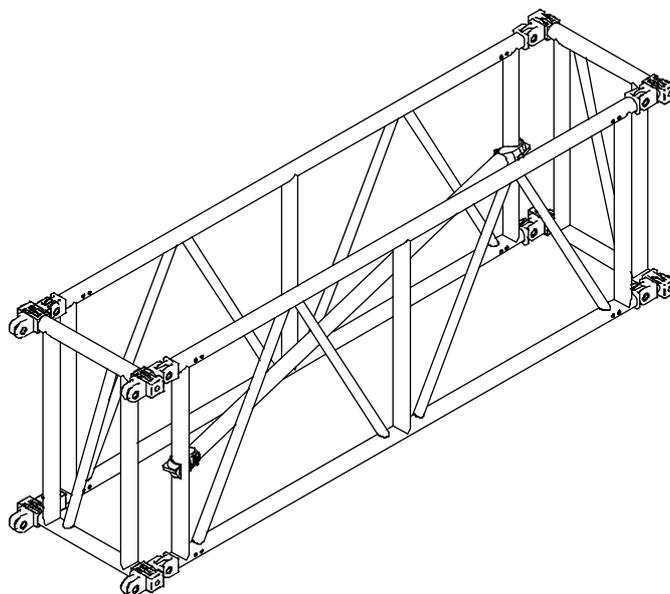


Fig. 18

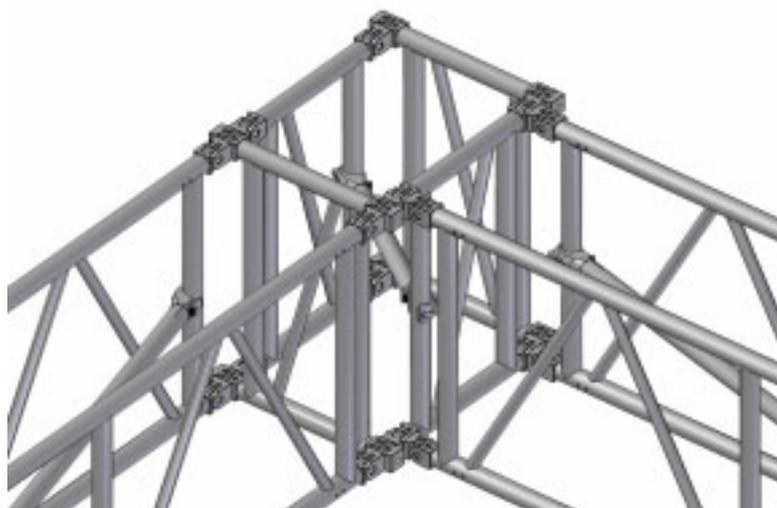
List of elements for a single module:

	300x47	200x47	100x47	47x47
FL76300	2	0	0	0
FL76200	0	2	0	0
FL76100	0	0	2	0
FL76047	2	2	2	4
KHLM	4	4	4	4
KHLF	8	8	8	8
KHLP	8	8	8	8
RAH	RAH289M3	RAH191M4	0	0

7. Corners.

In the following pictures, you can find some examples of corners and connection with a QL52 leg for structures assembled with Libera composite truss.

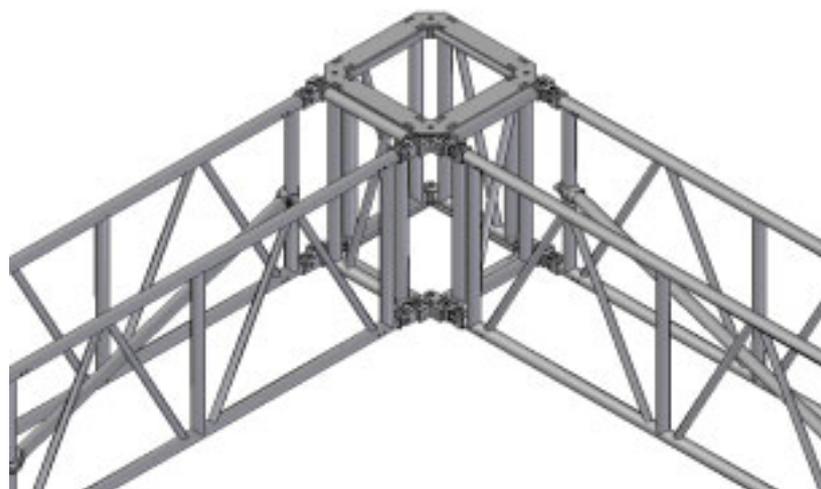
Two ways corner (vertical forks).



It considers as structure's base module the one made by two 47 cm gates (FL76047V) and two Libera flat modules with the right length, connected like already described;

- connecting the terminal forks, disposed inside the corner, to the vertical forks of the second module gate;
- connecting, in the same way, the opposite gate using pins and safety pins;
- closing the quadrilater by gate, interposing in each vertex a couple of forks (male and female);
- close the free end by nuts or screws.

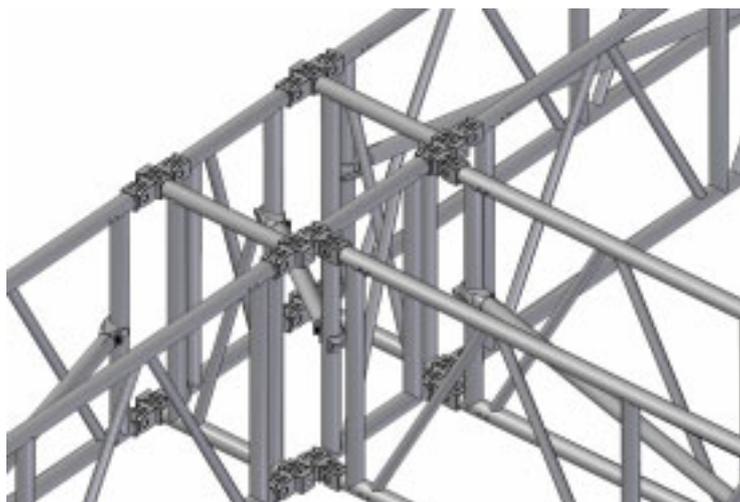
Two ways corner for QL52 (plans forks).



Like the two ways corner with vertical forks, it refers to the base module already described. The available forks for the connection are oriented in order to the vertical passing hole axis.

- Take two gates with plan forks (FL76047P). to close the quadrilater;
- joining two plates, up and bottom the gates;
- fixing everything by bolts, screws and eye-bolts.

Three ways corner (vertical forks).

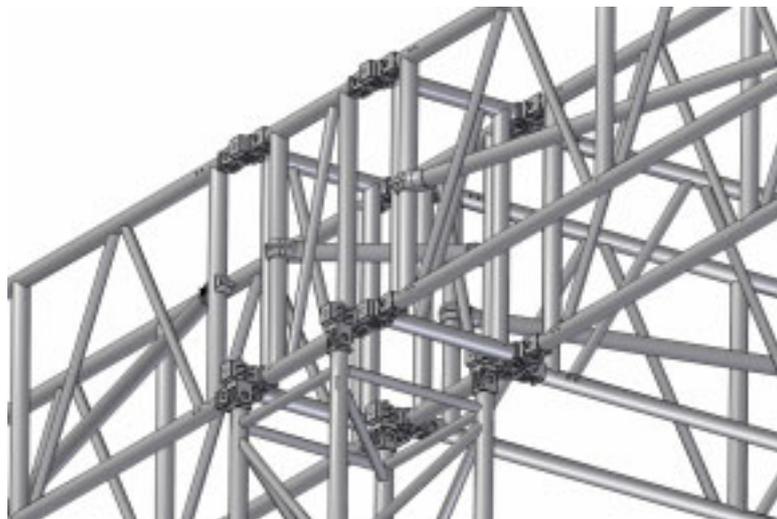


This corner is very similar to the two ways corner with vertical forks solution:

- joining the two base modules by the forks on the inside corner

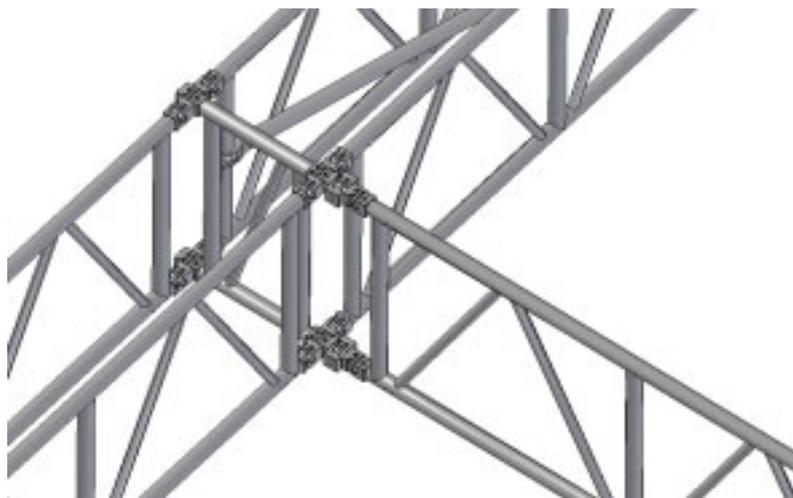
- assembly, in the same way, the forks of a third module.
- complete the quadrilater with a gate (FL76047V) located as already described before.

Four ways corner for QL52 (plan forks).



The procedure follows closely the three ways corner with vertical forks solution, but before closing by nuts or bolts all the vertex', fix QL52 truss fixed to the quadrilater base using three forks (two males and one female or two female and one male in order to connections previously realized). This system's purpose is locating the forks to lodge the tower.

Three ways flat corner.

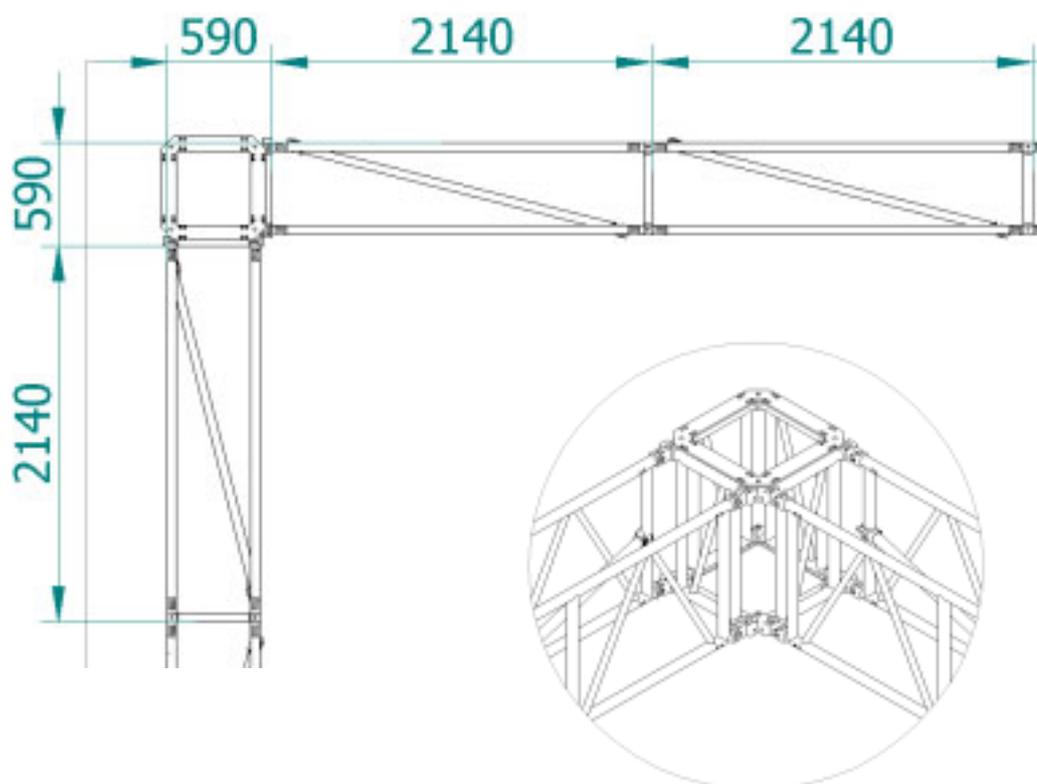


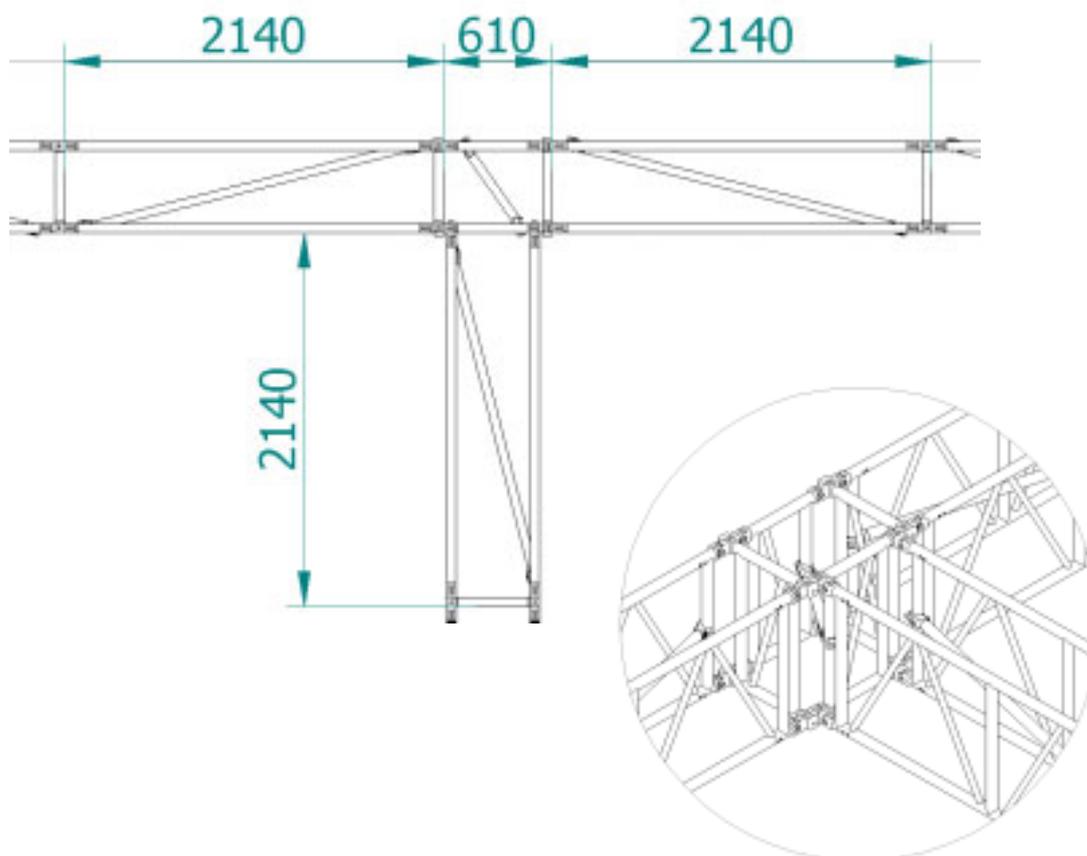
- Connect longitudinally base module with two FL076, simply assembling the forks;
- interpose two female and a male forks for each ends among the gate's female forks and the cross truss.

To stiffen the structure, and the corner particularly, it suggests inserting a RAH047 among the gates.

Sizes

In the following pictures there are two examples about the main sizes of the most common Libera components.





8. Handling and maintenance.

Recommendations for handling of the trusses:

- Do not pile up more than twenty trusses one upon the other.
- Handle the trusses with the fabric sliding track with special care, taking care not to throw them brusquely to the ground, nor to use a hammer directly on their upper edge during assembly.
- Do not directly strike either the forked ends of the trusses, or the screw bolt, or the screw nut connectors with a metal hammer.
- Always use the recommended equipment, which can be supplied upon request.

Recommendations for the maintenance of the trusses and the fabric sheets:

- Periodically check the state of wear and tear of the equipment, both in conditions of storage, as well as under conditions of use.

- Periodically check the tightness of the closure of the bolts, which connect the trusses with the fork connectors.
- Periodically check the state of the fabric sliding track.
- Keep the fabric sheets clean, and rolled up in order to avoid folds.

9. Perimeter closures.

The trusses on the two lateral sides of the structure are sufficiently locked closed by means of a screw bolt together with its relative safety ring, as illustrated in figure 6.

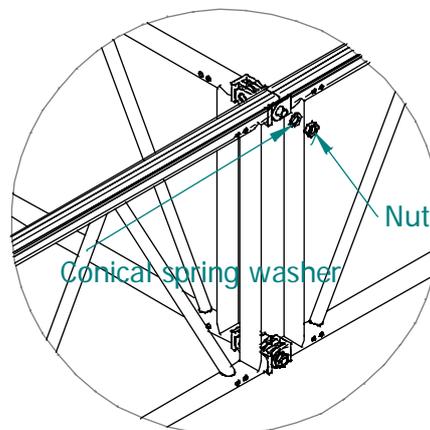


Fig. 6

The front and back part of the space frame can be completed by:

- a. Simple closure of the structure obtained by placing a screw nut connector on the forked ends of the truss

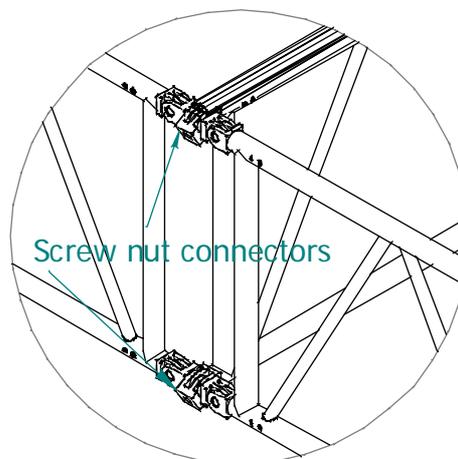


Fig. 7

- b. Using the special curved FL76111RH trusses, suitable for the guiding of the covering fabric in a downward direction. These are connected to the structure in the same way as the other trusses are connected. They must be prepared to accept the fabric tube by inserting a pair of screw bolt and screw nut connectors into the correct hole (see fig. 8).

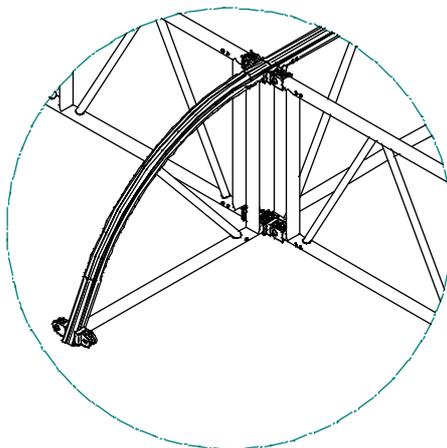


Fig. 8

10. Assembly of the covering fabric.

The Libera structure can be used as a covering system by using polyester fabric sheets impregnated with PVC, produced in rectangular strips of suitable dimensions, with lengthwise edges which allow for the sliding of the sheets within the guide tracks provided on the upper part of the FL76R trusses.

1. For insertion and fixing of the fabric sheets, proceed as follows:
2. Place the fabric sheet at the front part of the assembled structure.
3. Insert an aluminium tube, having a length corresponding to the width of the fabric sheet, into the back pocket compartment of the fabric sheet (fig. 9).

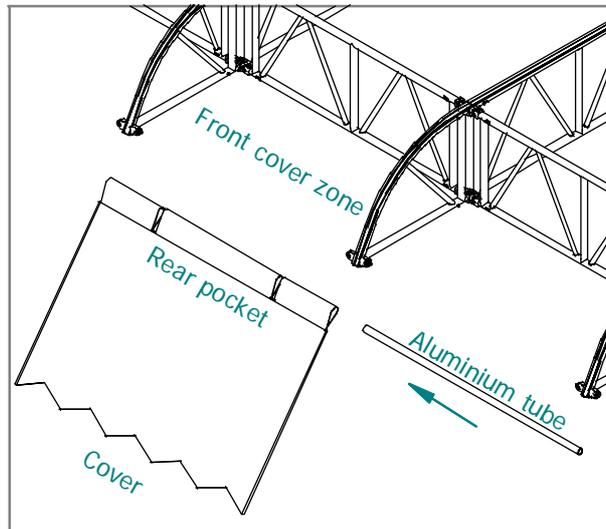


Fig. 9

4. Insert the edges of the fabric sheet into the special guide tracks provided on the FL76R trusses, and slide it along the track by gently pulling until it reaches the back part of the covering structure (fig. 10).

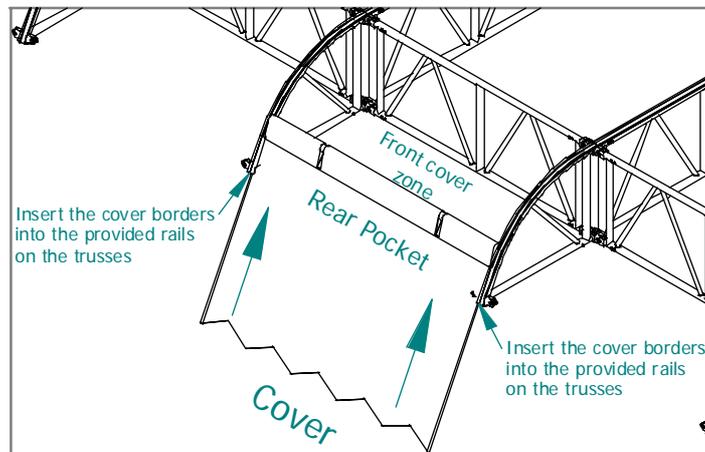


Fig. 10

5. Insert the stretcher element into the front pocket compartment of the fabric sheet (fig. 11) and connect it with two pins and two safety pins to the forked connectors provided for on the front FL76111RH elements.

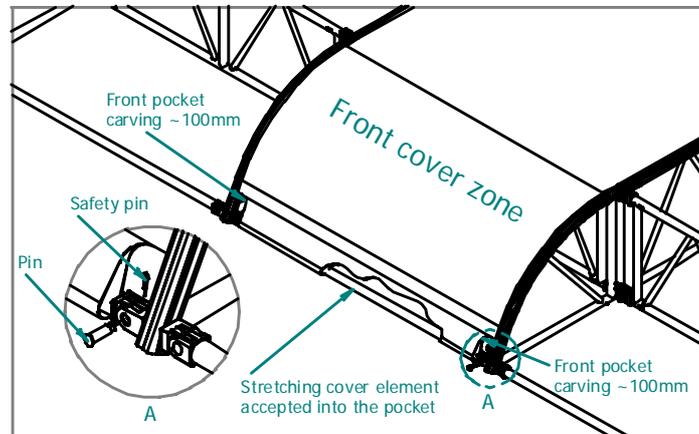


Fig. 11

6. Hook the other fabric stretcher element to the curved trusses at the back of the covering structure by using two pins and two safety pins.
7. If the fabric sheet is being used for the first time, it will be necessary to make notches on the front and back pockets, in order to allow it to be fixed to the structure, and to allow for positioning of the ratcheted belts, as illustrated in figures 11 and 12.
8. Connect the tube within the fabric sheet back pocket, to the fabric stretcher tube found at the back of the covering structure, by using two ratcheted belts (fig. 12) and then put the fabric sheet under tension by tightening the belts.

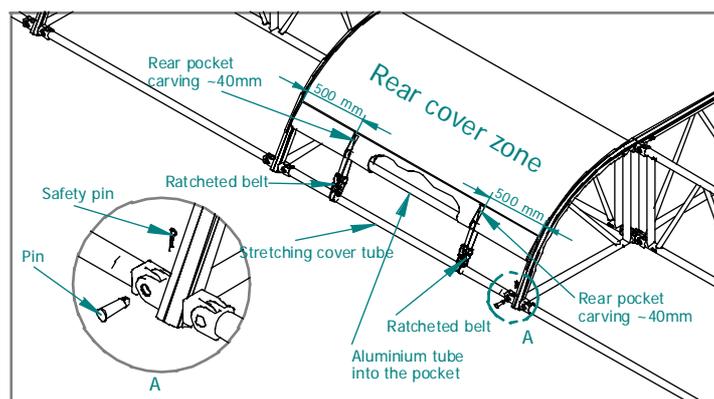


Fig. 12

11. Hoisting up the structure.

The structure can be hoisted up with the MT52, MT40 truss towers or with the Varitower 40, preparing the fork connectors as indicated in the instruction manual concerning the towers and the accessories.

In addition, the structure easily lends itself to being integrated into a multidirectional framing system; in this case fastening and harnessing for hoisting can be carried out with the help of eye-bolts screwed in place, in substitution for the side bolts (see fig. 13), or by direct hoist harnessing on the truss itself.

And finally, the Libera structure can be hung from any point of the framework structure, by simply substituting a pin, with a double eye-bolt, as illustrated in figure 14.

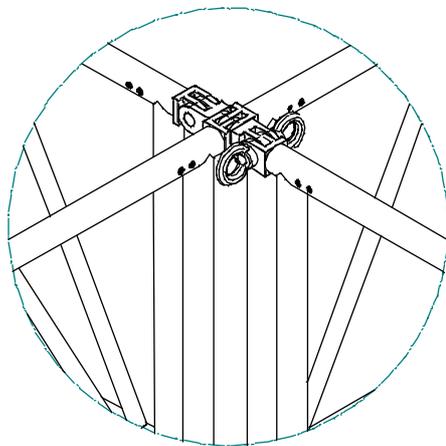


Fig. 13

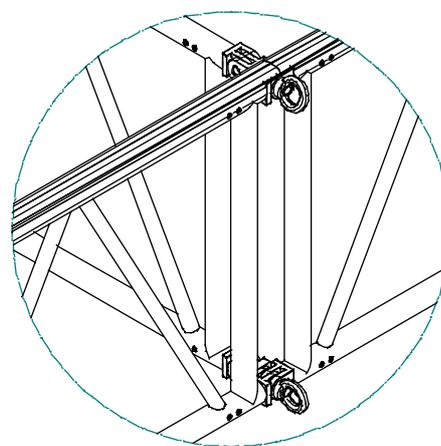


Fig. 14

12. Dismantling of the structure.

Dismantling of the structure can be carried out by repeating in a reverse manner, the operations which are described in the paragraphs concerning the assembly process.

The structure must be progressively dismantled in such a way so as to preserve its stability during the execution of the work.

13. Useful advice.

- It is possible to achieve a slightly convex conformation of the structure, by not using the elastic washers on the lower connections of the trusses, so as to be able to more firmly tighten the screw bolt and screw nut connectors, thus creating an angulation at the attachment between the trusses.
- In order to achieve a perfect alignment of the holes of the fork connectors, it is advantageous to use the pointed punch tool which is provided in the Libera assembly kit.
- If the insertion of the screw bolt fork connector into the hole between the ends of the truss is difficult, proceed as follows. After you have checked on correct alignment, delicately hit the connector with a rubber hammer until it is completely inserted, (or use a normal hammer, placing a piece of wood between the hammer and the connectors), taking care to not scratch the zinc galvanised coating.

14. Contacts.

Please contact our Technical Office for any need you may have.

Reference:

Tel. 041 596 00 00

Fax 041 595 10 82

mail to: helpdesk@litectruss.com