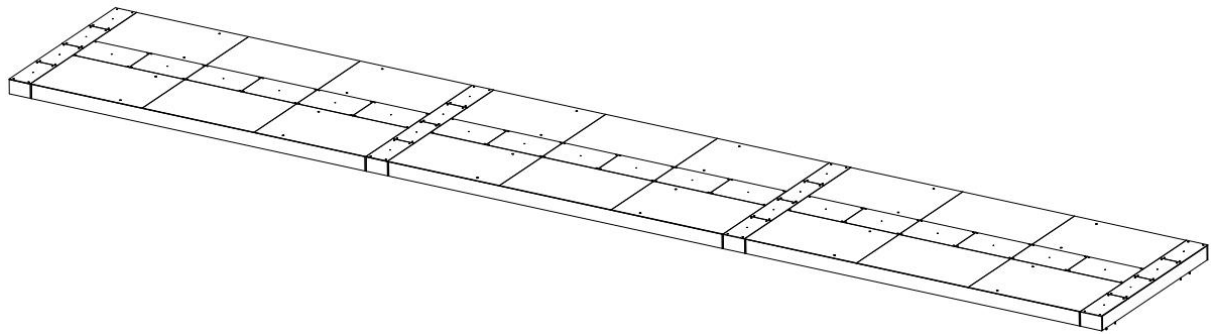


ARPEGE MASTERK

St PRIEST, 01 June 2017,

PERFECT™ WEIGHBRIDGE INSTALLATION MANUAL



Software No.	Manual Reference	Edition
	PON_Gb_PERFECT™ weighbridge installation instructions_rev04.docx	05

PERFECT TM WEIGHBRIDGE INSTALLATION MANUAL

Date	Edition No.	Subject of the modification
04/04/2014	00	Original
04/09/2014	01	Update with change of identification of modules/change in fastening of upper sensor Countersunk screw
09/11/2015	02	Update of views as per the new design
01/09/2016	03	Update of instructions & views as per the latest design
24/03/2017	04	Update of lifting bails
01/06/2017	05	Update as per latest design

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1 DESCRIPTION OF TM WEIGHBRIDGE

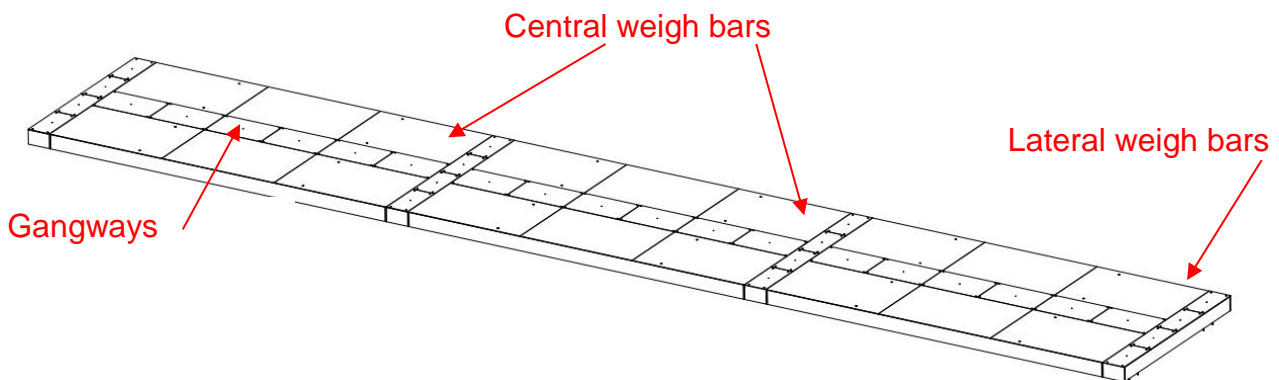
ARPEGE MASTER K PERFECT TM modular weighbridges are available in different lengths and widths.

The weighbridge is fitted as standard with **ARPEGE MASTER-K** digital load cells.

Each module is divided longitudinally into 2 equal sections (gangway).

The gangways are made of a welded steel frame, each module comprising 2 gangways being manufactured in pairs to ensure all parts to be assembled match up perfectly.

The weighbridge is fixed on site onto the civil engineering structure constructed by the builder in compliance with the **ARPEGE MASTER K** specifications.

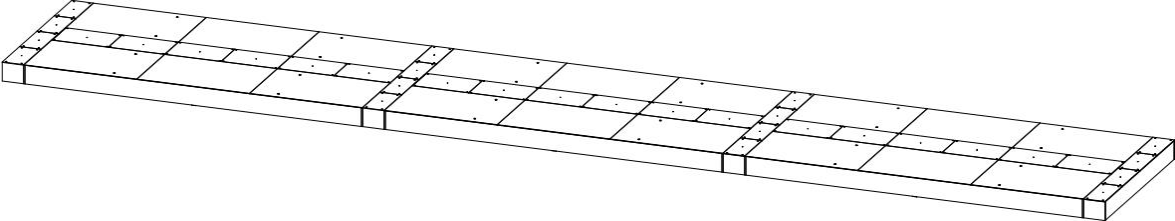


The length and number of modules depend on the length of the weighbridge.

1.1 WEIGHBRIDGE CONFIGURATION

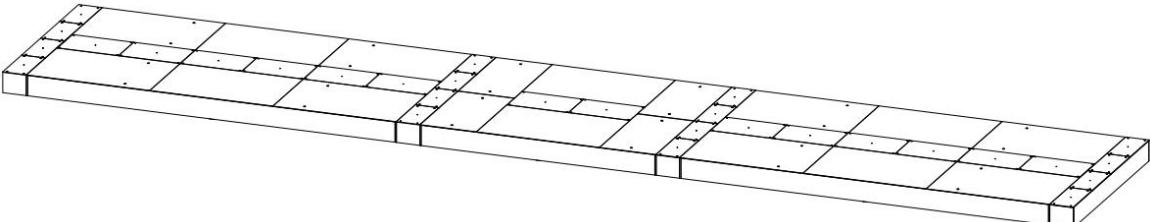
18m

3 long modules + 2 central weigh bars + 2 lateral weigh bars



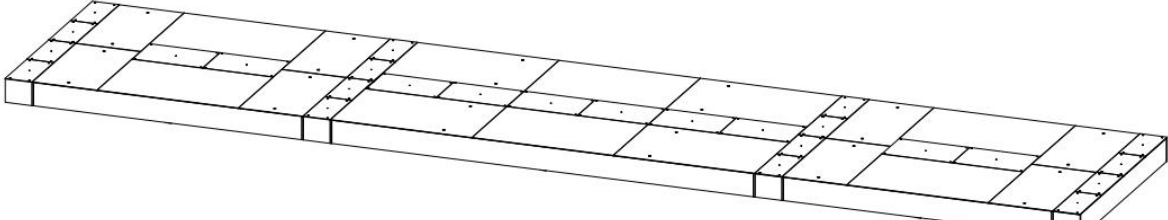
16m

2 long modules + 1 short module 2 central weigh bars + 2 lateral weigh bars



14m

1 long module + 2 short modules 2 central weigh bars + 2 lateral weigh bars



Other configurations are possible using the same principle

2 EQUIPMENT REQUIRED FOR INSTALLING THE WEIGHBRIDGE

1 controlled aligning sight and its accessories

1 class II 20 m tape

1 sensor level

1 line length 25 m

1 hammer drill

1 drill bit dia. 20 mm length 600 mm minimum.

1 drill bit dia. 12 mm length 500 mm minimum.

1 anchor bolt drift tool

standard mechanic's tools (*set of flat wrenches/ratchet wrench/pliers/screwdriver, etc.*)

2 x 36 mm open-end wrenches (*Mounting bolts, setting of end bumpstops*)

1 x 46mm open-ended wrench for central bumpstop.


1 set of Allen keys

Standard electrician's tools (*Wire strippers/cutting pliers/terminal lug crimping tool/crimping pliers for end sleeves/flat-bladed screwdriver/cross-head screwdriver, etc.*).

1 tube of PVC adhesive (for wire guide tubes).


3 ACCEPTANCE


3.1 Civil engineering structure

 Under no circumstances may the weighbridge be installed before the civil engineering structure has been inspected, particularly with regard to the planeness of the support points.

The measurement of the vertical differences between the support points determines whether any shimming is required.


In this case, the measurement of the differences will determine the location and thickness of the shims to be installed.

 **Caution:** It is essential to install these before the modules are put in place as it is not possible to access them afterwards.

 **Caution:** the maximum vertical difference allowed between the support points once the shimming has been installed is **+/- 3mm**.
(As far as possible reduce this to a minimum depending on the shims available)

Check the presence of the earthing rod (outside ARPEGE MASTER K supply) and (or) the arrival of an earthing cable at the location defined on the civil engineering drawings.

Check for the presence of one (or more) groundwater drains at the bottom of the pit.

 **Important:**
Any anomaly observed during acceptance of the civil engineering structure must be recorded on the acceptance report and as far as possible observed by the ordering party.

Before the weighbridge is installed, the pit must be cleaned and in particular any concrete residues removed.

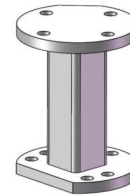
3.2 Hardware

When the weighbridge arrives, check that all the required parts are present **using the table in the appendix (quantities depend on the configuration of the weighbridge)**

Anchor bolts M20 x 160
 Anchor bolts M12 x 110



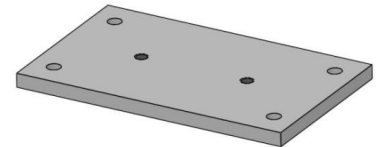
Dummy load cells



M14 & M24 lifting bails for handling



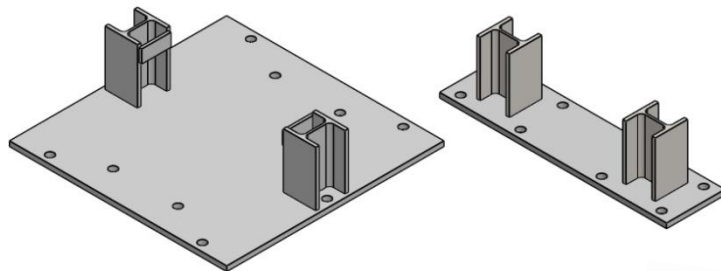
Baseplate (load cell support plates)



lower dowel clamping plate



Stop plates: Longitudinal & Transverse



Raft clamping backing plate



M24x70 bolts + nuts + flat washers
 + GROWER washers.



M24x110 bolts & GROWER washers.



M30 bumpstop 2mm pitch & nut.



Load cell. *Number according to weighbridge configuration.*



Lower & upper dowel. Number: *same as for load cell.*



Assembly brackets.

(For installation of top and bottom earthing braids).



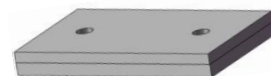
Earthing braids.



Fastenings for securing earth braid on bracket.

- 2 x ZEF 6/8 Hex-head bolts
- 2 x M8 hexagonal nuts
- 2 x 8 mm dia. washers
- 2 x 8 mm dia. external tooth lock washers

Set of 2 insulating plates *Number same as for load cell.*



Indicator.



Or other model depending on order

Connection cable for



Length 50 m or more depending on order

Earth cable



Length according to order.

Connection box



Adjusting shims. th.=1 Th.=2
Per load cell: 2 x 2mm + 1 x 1mm.



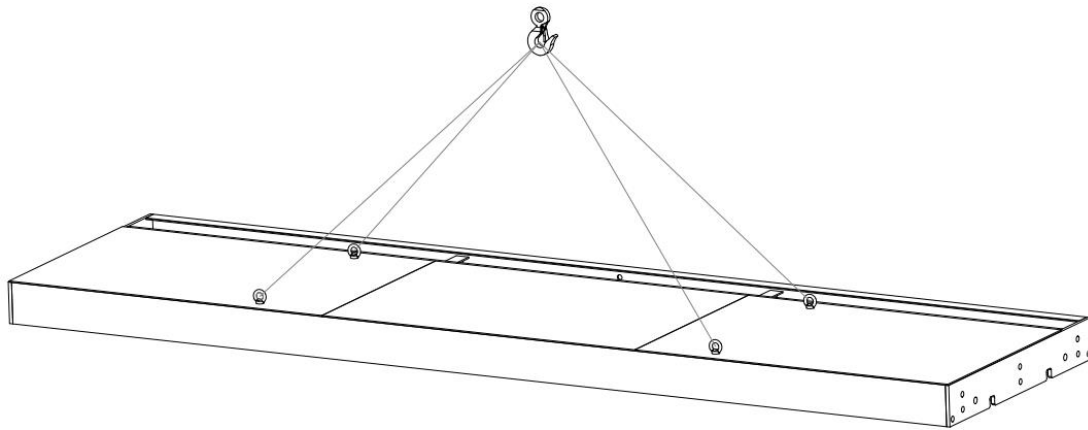
4 UNLOADING

Fit the M24 lifting bails provided onto the gangway.
 Sling the gangway at 4 points (this is essential) in compliance with the recommendations below and instructions from the crane operator.

Slinging for one gangway



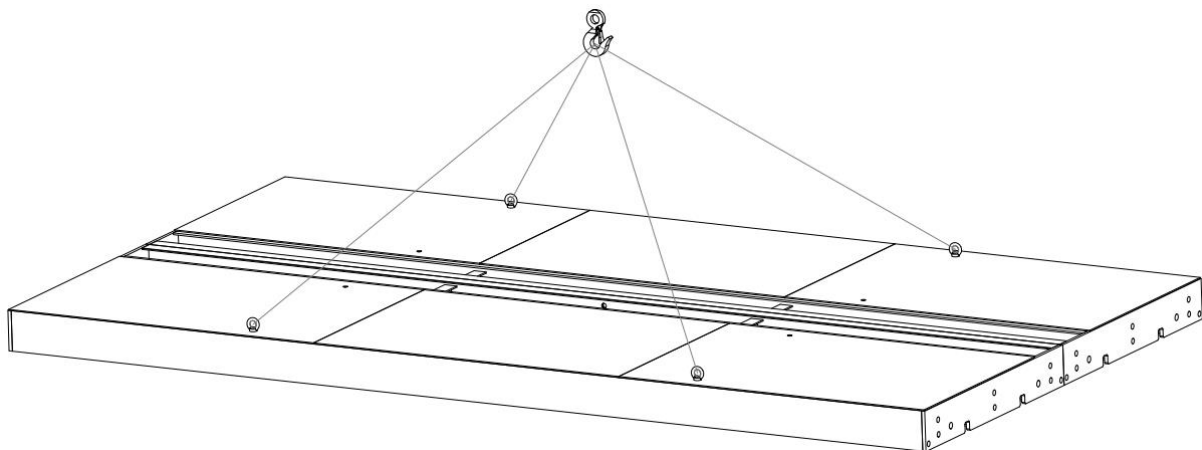
	1 gangway
Max. weight for the longest length	< 2000kg



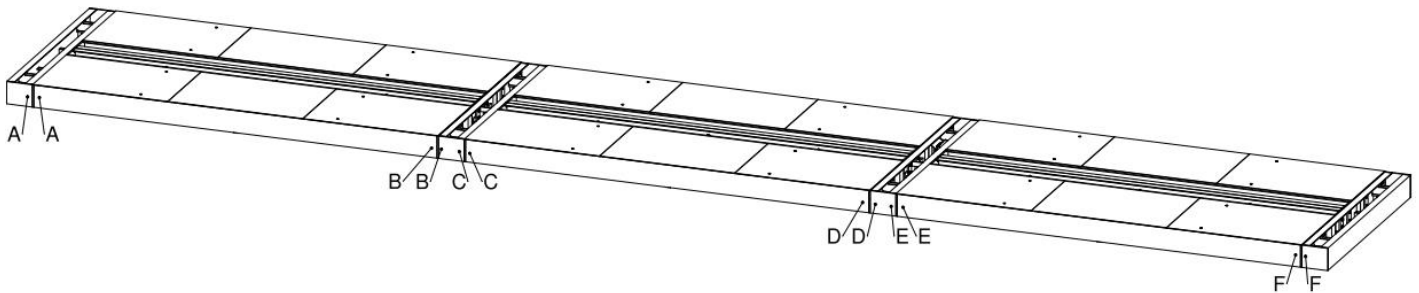
Slinging for one module



	1 module
Max. weight for the longest length	< 4000kg



4.1 Identification of components

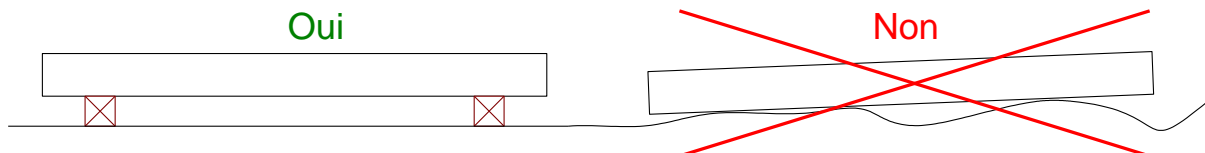


The various modules & components of the weighbridge have been marked and identified for ease of assembly.

It is essential to follow and comply with the identification markings.

4.2 Storing the components

The gangways or assembled modules must under no circumstances be laid directly on the ground: The modules must be laid on wooden battens of the correct size and on a flat, level surface.



5 PREPARATION/INSTALLATION

5.1 Preparation of civil works

Clean the load cell support surfaces on the civil engineering structure.
Check the sides of the civil engineering structure according to the drawings provided:

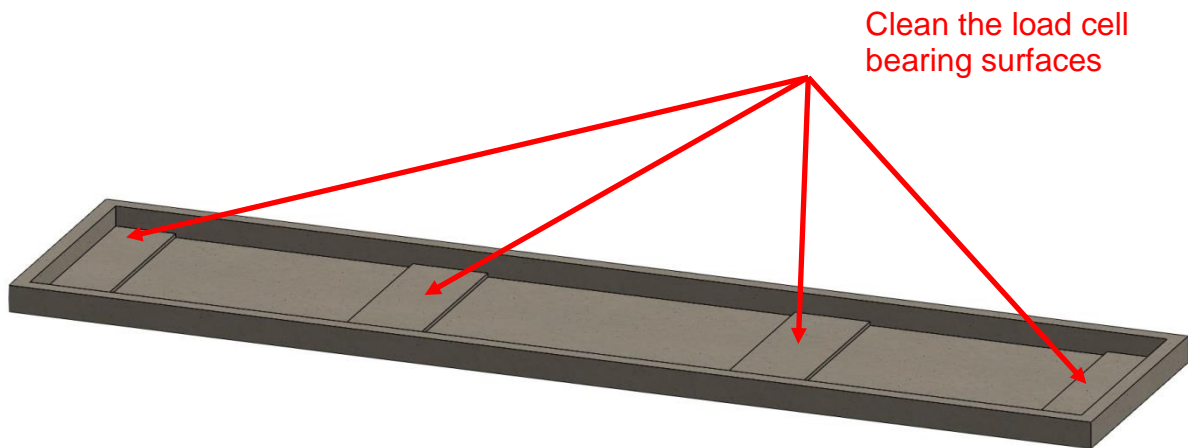
Length between weighbridge entry and exit wall.

Diagonals

Position of support blocks.

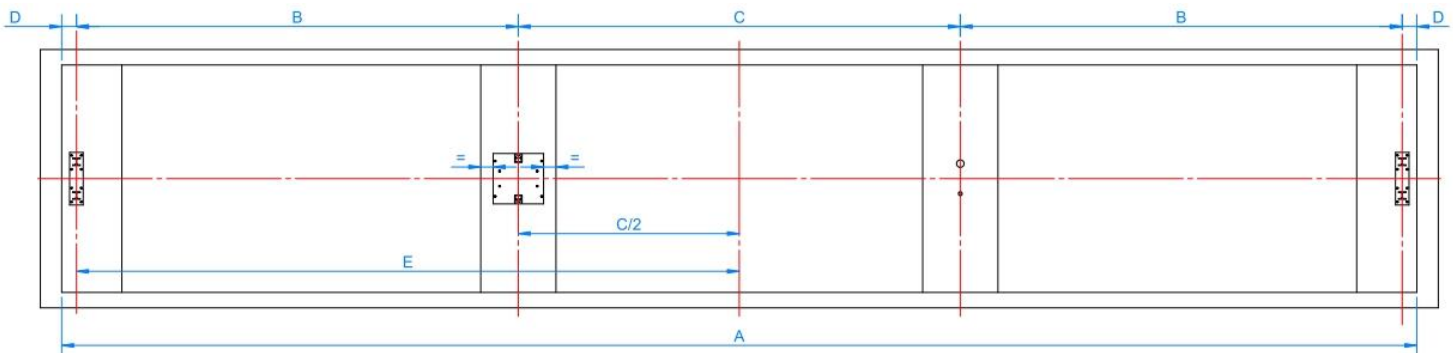
Vertical alignment of the walls of the pit

Height of the entry and exit walls along with the side walls if in a pit



5.2 Mark out the axes

Draw the longitudinal axis of the weighbridge

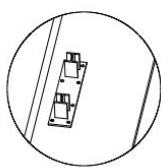
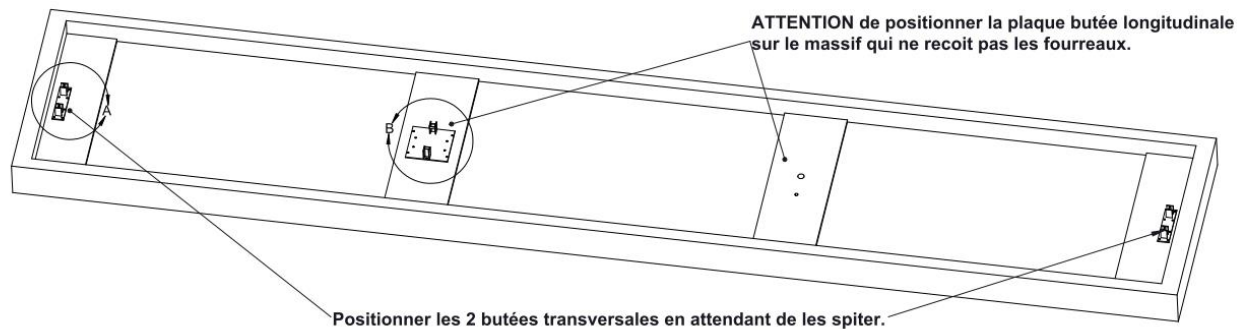


Draw the transverse axis of the weighbridge

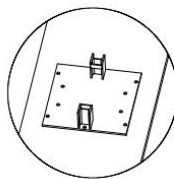
Draw the positioning axes of the stops and load cells

Standard length of weighbridges	A (mm)	B (mm)	C (mm)	D (mm)	E (mm) (B+1/2C)
14m	14040	3880	5880	195	6820
16m	16040	5880	3880	195	7820
18m	18040	5880	5880	195	8820

5.3 Position the longitudinal and transverse stops



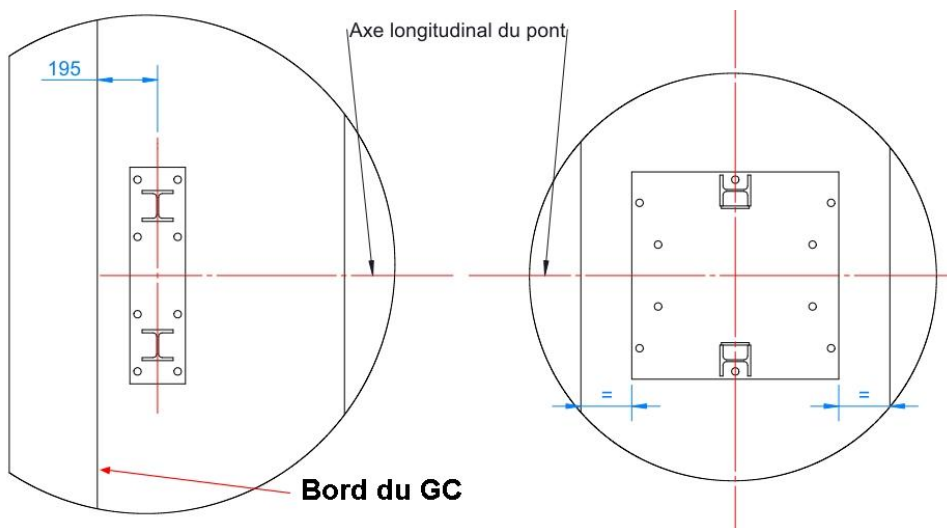
DÉTAIL A
ECHELLE 1 : 25



DÉTAIL B
ECHELLE 1 : 25

Position the stop plates in the civil works **without securing them.**

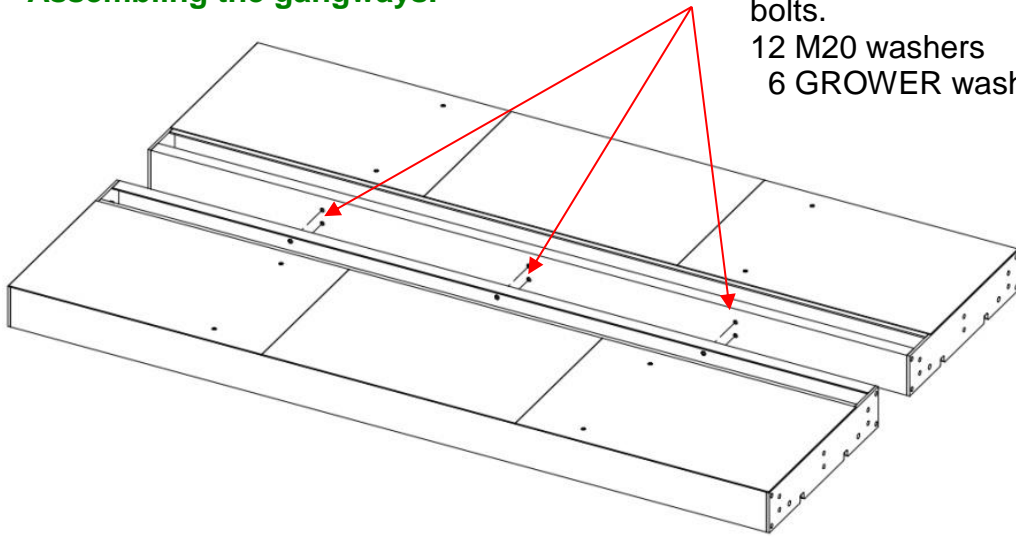
these stop plates will be finally secured after the weighbridge has been installed. The holes for the SPIT through-bolt anchors remain accessible through the structure.



5.4 Assembling the weighbridge

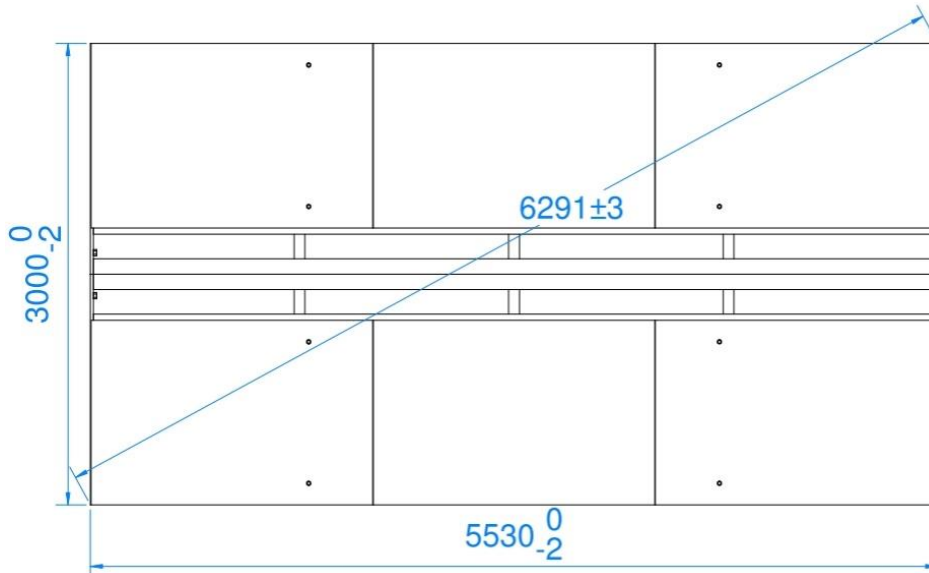
5.4.1 Assembling the gangways.

- 6 M24 x 70 hex-head bolts.
- 12 M20 washers
- 6 GROWER washers

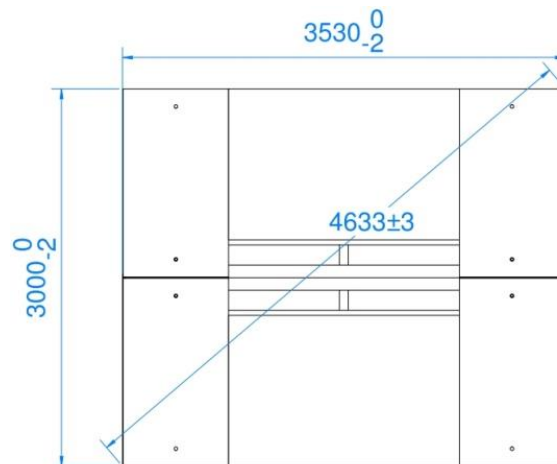


5.4.2 Check the 2 diagonals for each type of gangway.

Large gangway. 14m, 16m, 18m weighbridge



Small gangway. 14m, 16m, 18m weighbridge

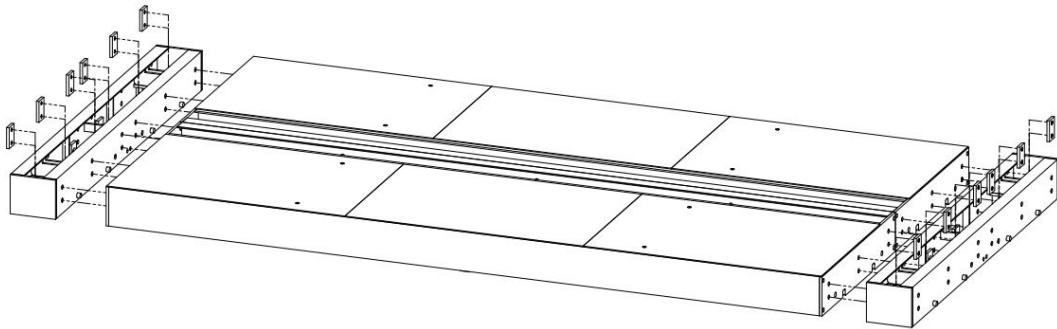


5.4.3 Assembling the central section (1 module + 2 weigh bars)

Fix the 2 central weigh bars onto the assembled module.
 Use the 12 backing plates and 12 M24 x 110 hex-head bolts + GROWER washers for each weigh bar.

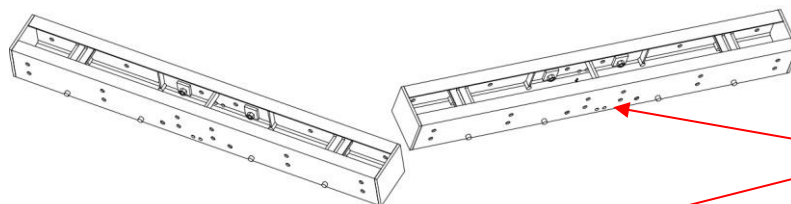
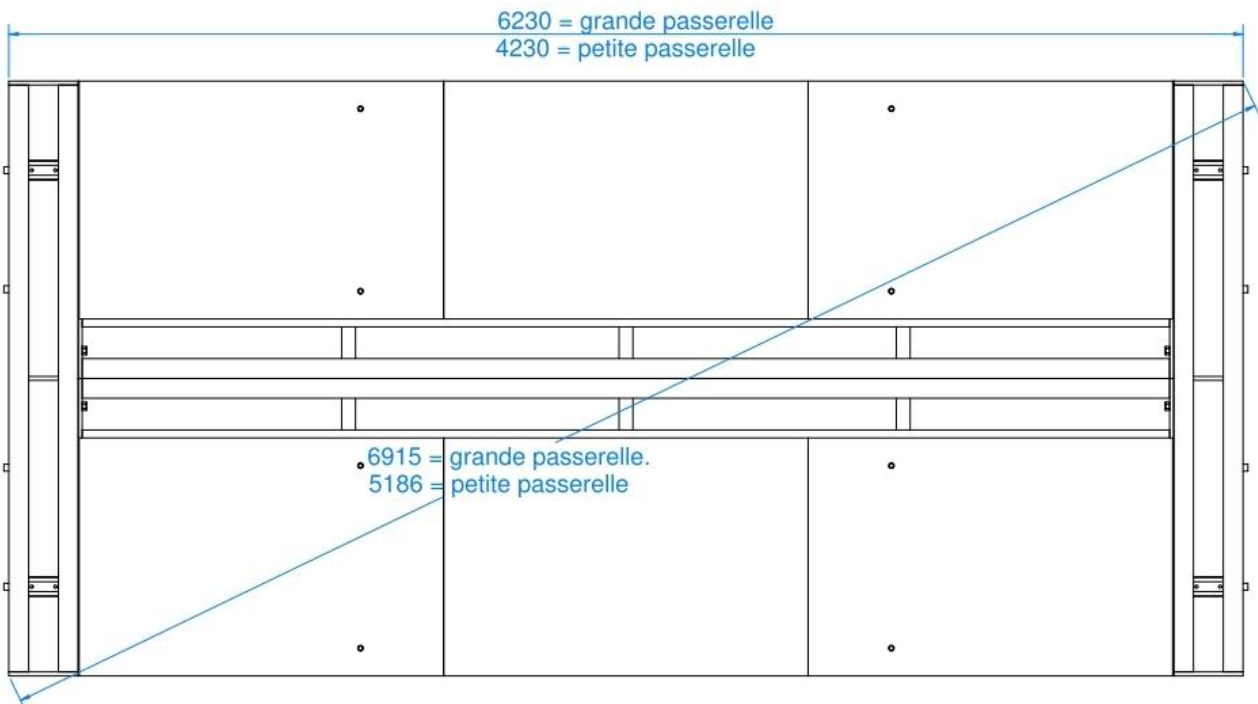


Weight of the assembly: < 4700kg

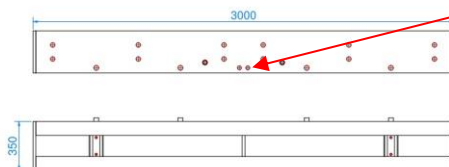


5.4.4 Check the 2 diagonals for each type of module.

Check the alignment of the diagonals then lock the bolts.

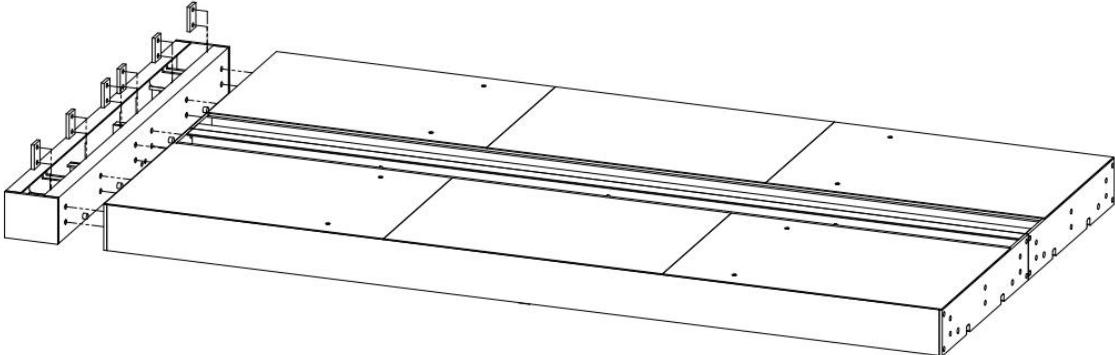


Holes for wire guide tube

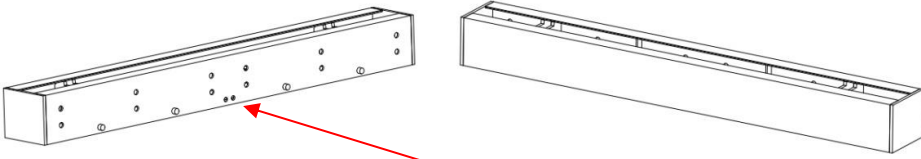
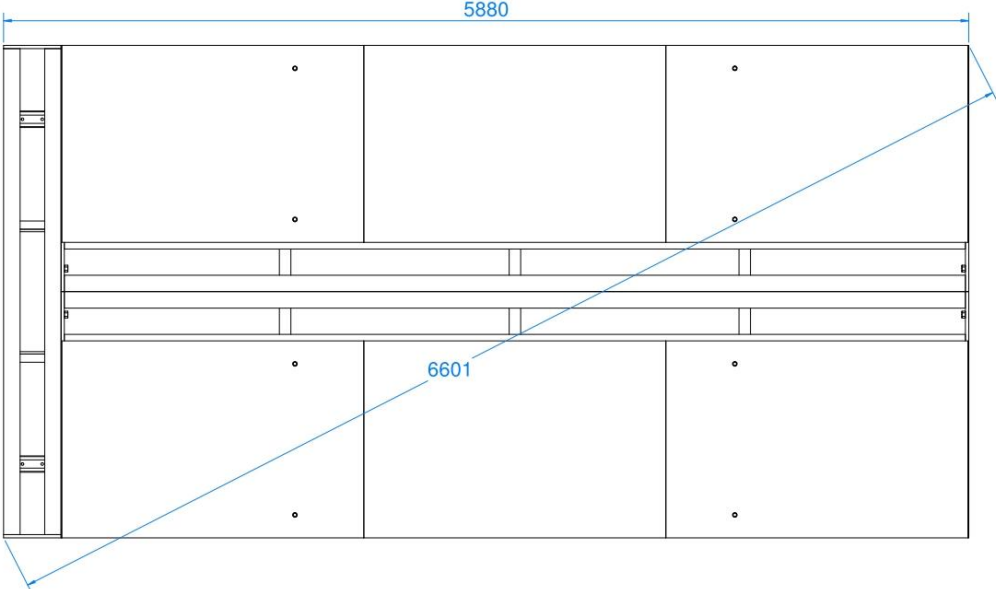


5.4.5 Assembling the lateral pontoon

Assemble the lateral sections in the same way as for the central one.
Fix the end weigh bar on the end module
Use the 6 backing plates and 6 M24 x 110 hex-head bolts + GROWER washers



5.4.6 Check the 2 diagonals for each type of module.



Holes for wire guide tube

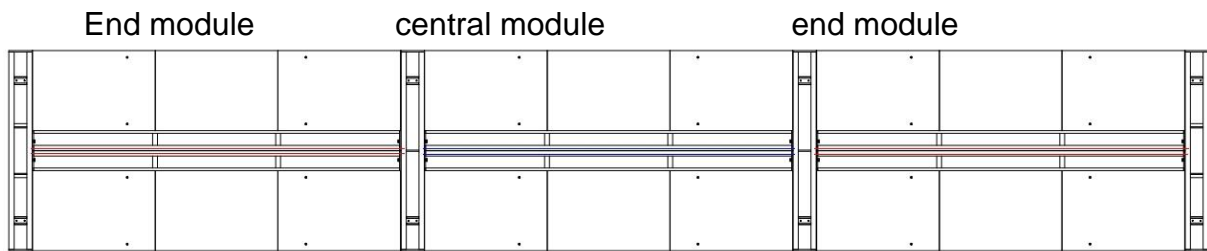


5.4.7 Presence of sleeves

Check the sleeves used for passing the load cell cables through the modules are present

If the sleeves have not been ordered, use the ordinary rigid insulation tubes provided and cut them in accordance with the table below.

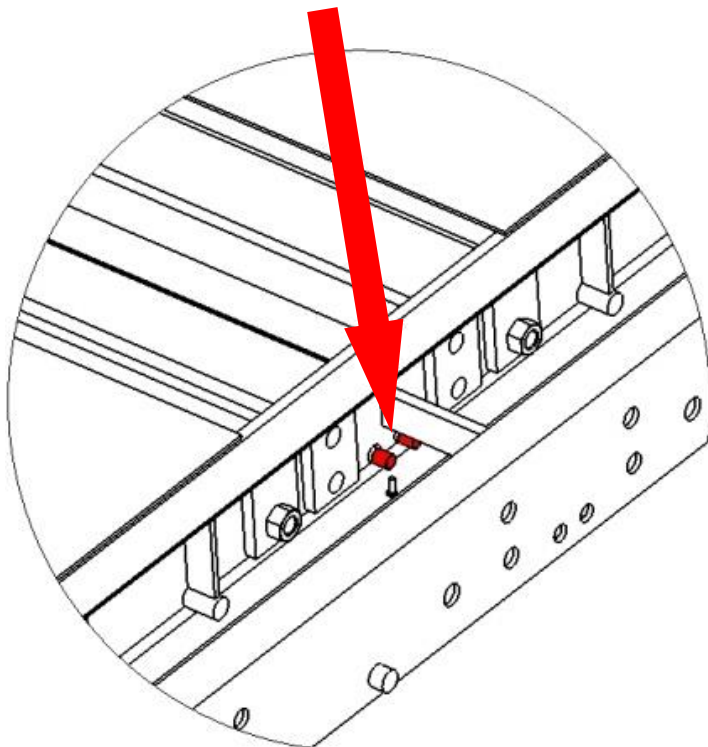
It is recommended to bond the tube insertions using PVC adhesive or failing that adhesive tape.



	End module	Central module
18m	3m + 2.6m = 5.6m (X 4)	3m + 2.6m = 5.6m (X 2)
16m	3m + 2.6m = 5.6m (X 4)	3m + 0.6m = 3.6m (X 2)
14m	3m + 0.6m = 3.6m (X 4)	3m + 2.6m = 5.6m (X 2)



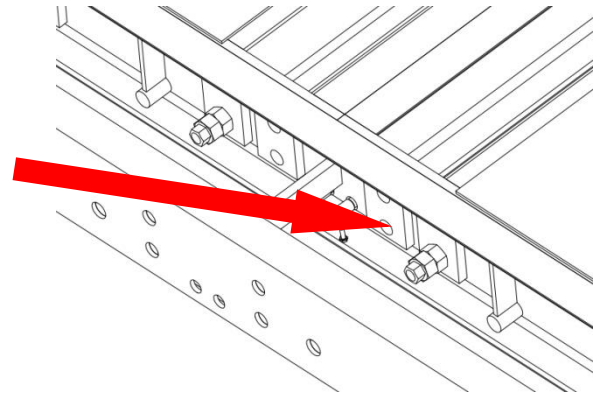
IMPORTANT The wire guide tubes for the end modules will be offset after the modules have been installed to arrive inside the centre module.



5.4.8 Bumpstops

Prepare each module by inserting the bumpstops in their recesses

Screw all bumpstop bolts by hand as far as possible into the welded nut. This is to avoid them getting damaged during installation.

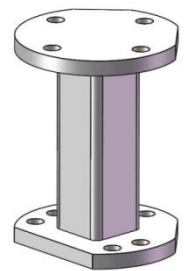


5.4.9 Fitting the dummy load cells

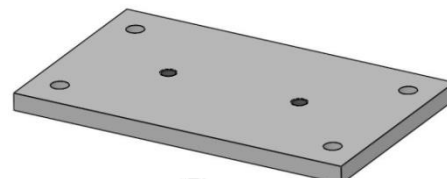
If the dummy load cells are not already fitted to the structure.

Assemble:

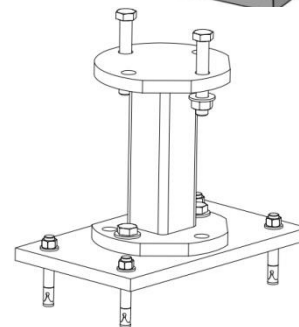
The dummy load cell using M14 x 45 hex-head bolts + washers



The load cell support plate



Screw in the dummy load cell.



Fix the dummy load cell to the support plate using the relevant screw fittings. (2 x M14 x 35 + 2 x external tooth washers).

Repeat the operation for each load cell on the weighbridge.

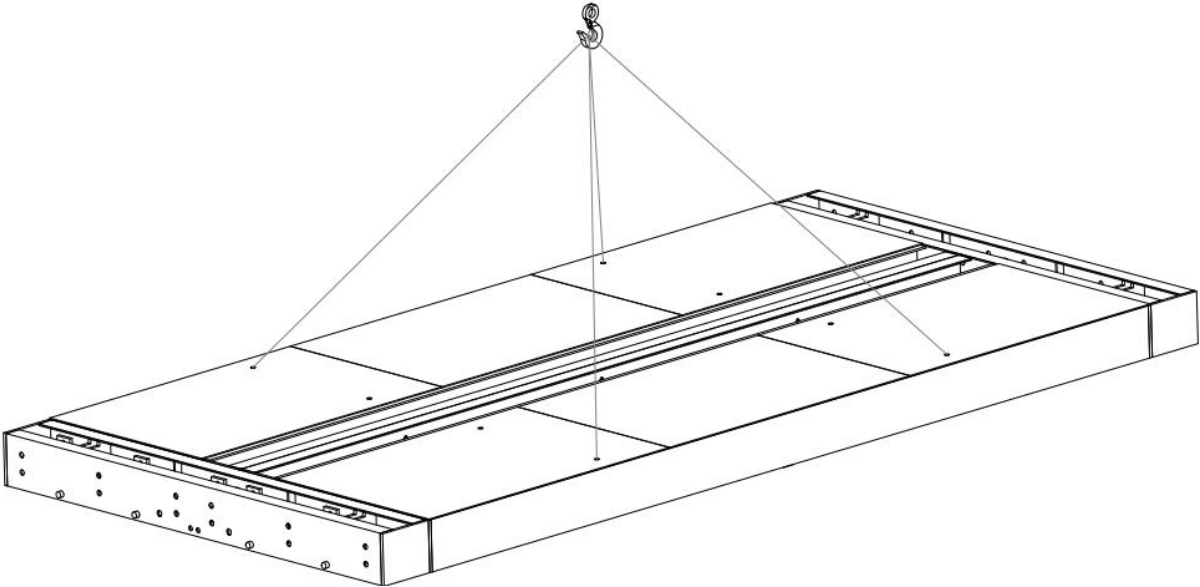
5.4.10 Fitting the dummy load cells in the weigh bars

Then fit the dummy load cell + support plate assembly into the weigh bars using 2 M14 x 80 hex head bolts at the top.

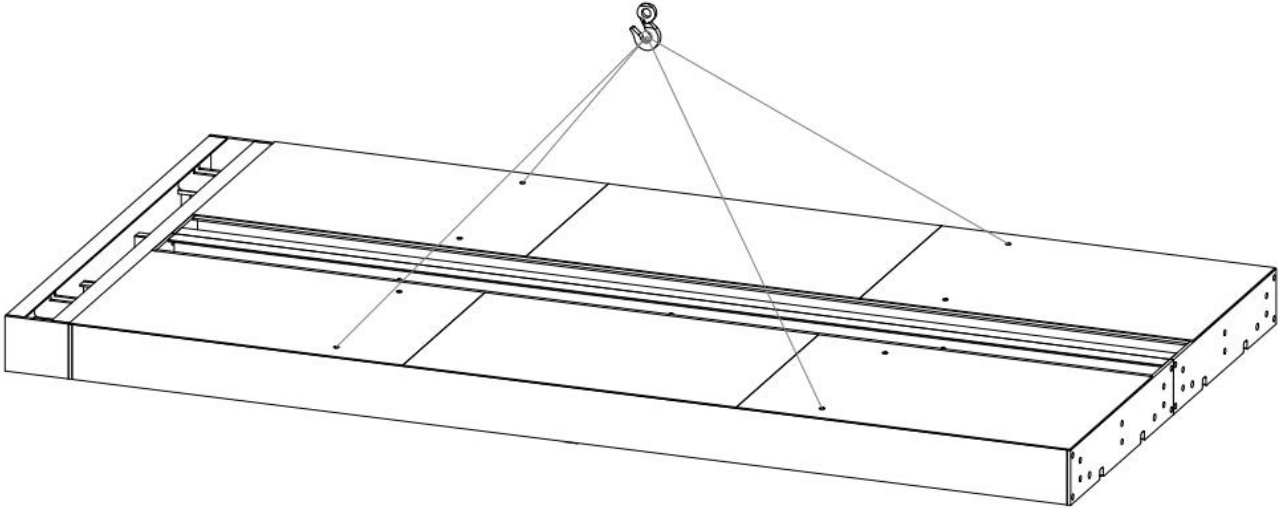
5.5 Installing the pre-assembled components

5.5.1 Slinging the weighbridge components

Central section: max weight < 4700kg

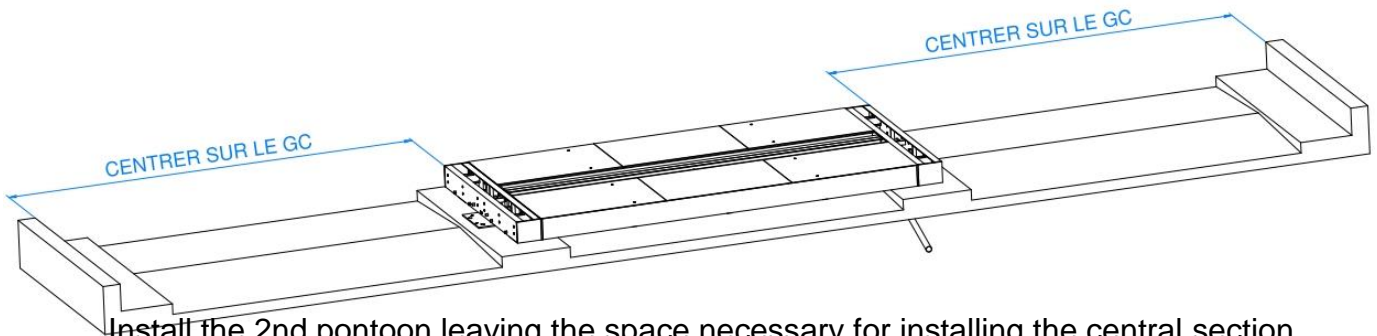


Lateral section: weight < 4200kg

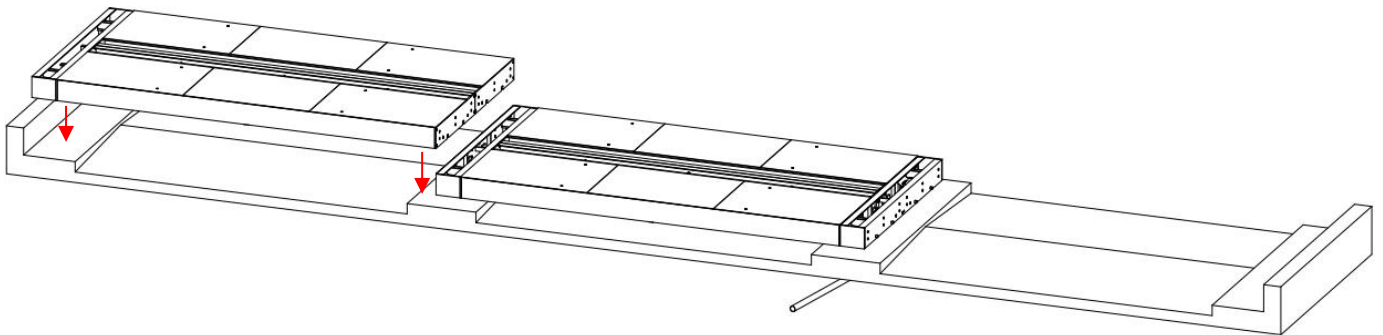


5.5.2 Installation

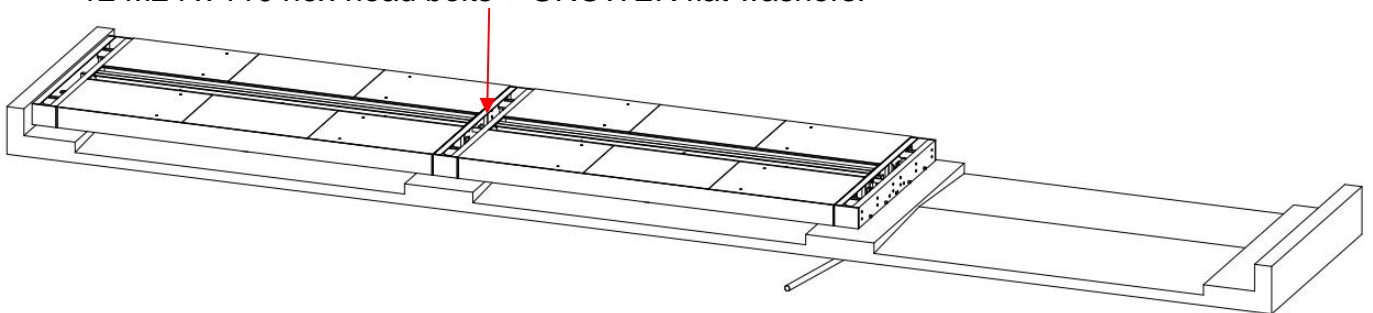
Install the 1st pontoon leaving the space necessary for installing the 2 other sections.



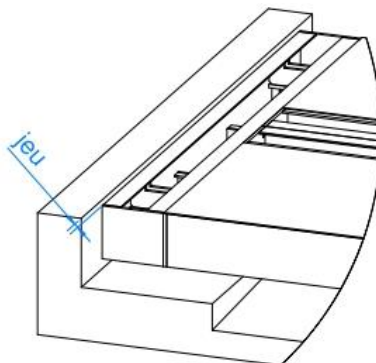
Install the 2nd pontoon leaving the space necessary for installing the central section. About 15 mm. Gently lower the lateral section until it rests on the dia. 35 lugs provided in the central weigh bars.



The 2 sections are assembled and clamped in place using the 6 backing plates and 12 M24 x 110 hex-head bolts + GROWER flat washers.

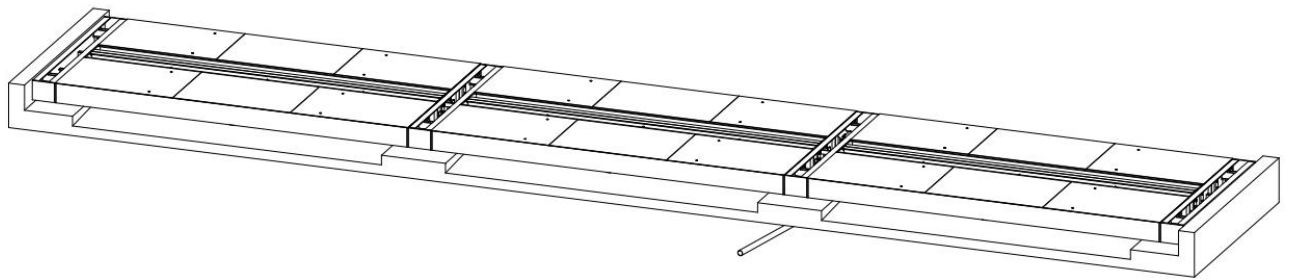


Once the lateral section is in place, there must be a clearance of 15 to 25 mm relative to the edge of the pit required for the weighbridge to operate correctly.



Installation of the 2nd

lateral section.



This assembly will be secured using the same procedure.



Once the 2nd section has been lowered, fit the 24 M24 x 110 bolts (1 bolt + 1 flat washer + 1 GROWER washer)

If necessary, slide the components in order to centre the weighbridge in the civil engineering structure.

Ensure the upper part is perfectly aligned

5.5.3 Checking the geometry of the assembly

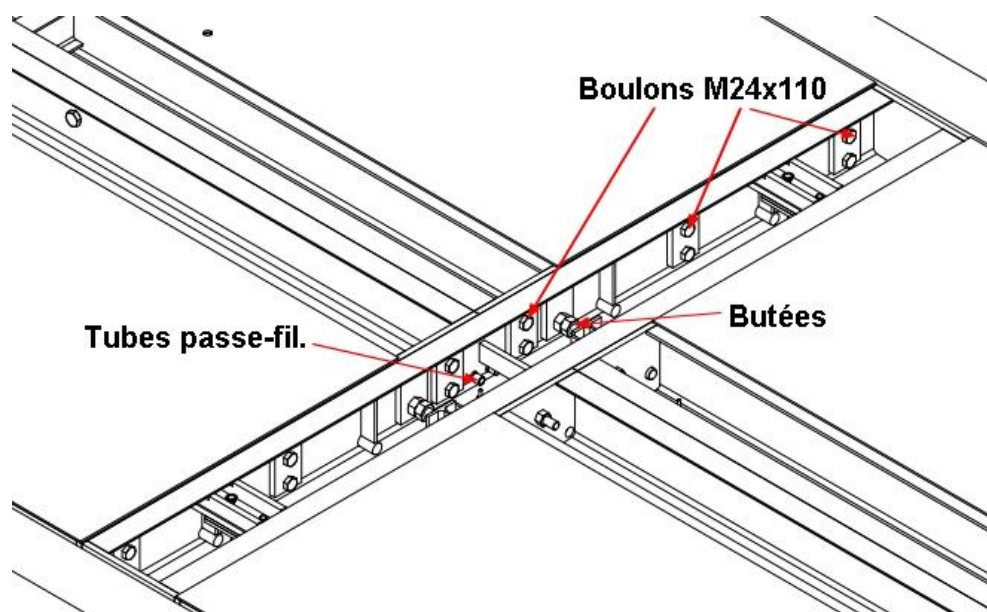
- ⇒ Equal diagonals
- ⇒ Width at different points
- ⇒ perfect alignment of the upper section
- ⇒



Correct if necessary

Lock all bolts.

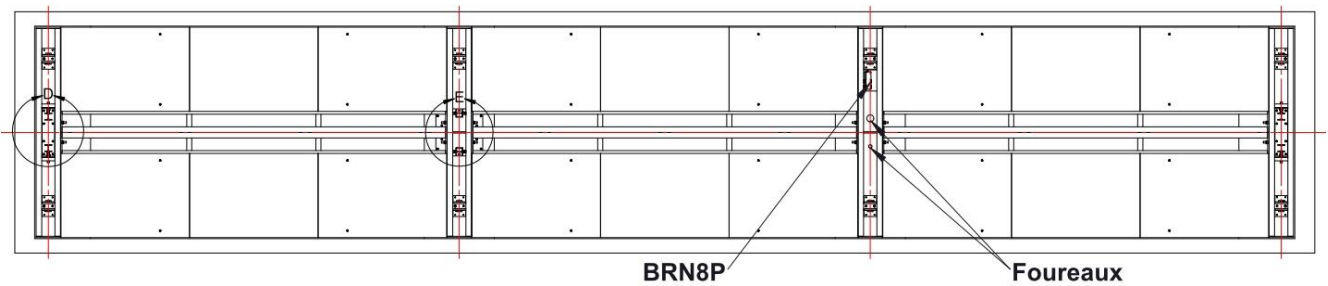
Ensure the wire guide tubes are easily accessible in all weigh bars.



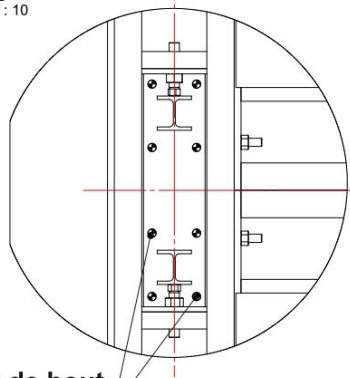
Carry out a final check that the weighbridge is correctly centred within the civil engineering structure.

5.5.4 Positioning the bumpstops

The weighbridge has been positioned within the civil engineering structure.
 Position the stop plates to distribute the clearance
 Bring the bumpstop screws up against the stop plates.
 Lock them in this position.

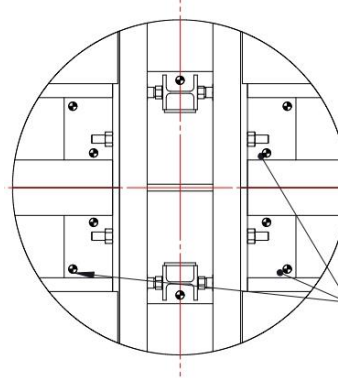


DÉTAIL D
 ECHELLE 1 : 10



Plaque butée de bout.
 4 SPIT mini. 2x.

DÉTAIL E
 ECHELLE 1 : 10



Plaque butée centrale.
 6 SPIT mini.

5.5.5 Fixing the bumpstops

Drill holes of dia 20 mm in the civil engineering structure
 Clean the holes
 Fix the stop plates using the M20 SPIT through-bolt anchors provided.

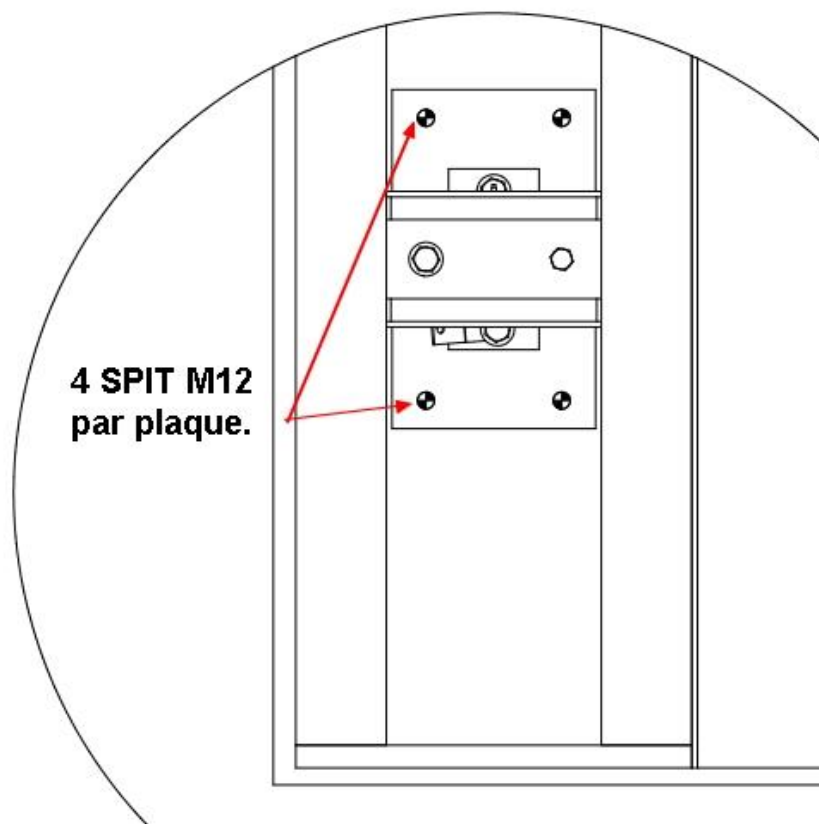
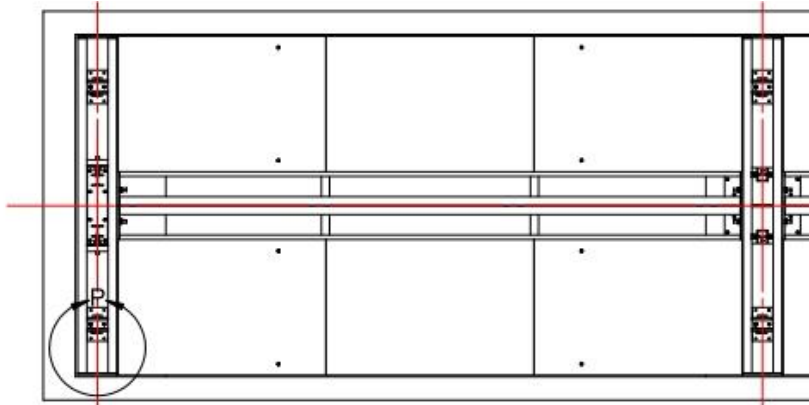
Note: If one of the holes hits a rebar, use another hole

- 6 SPIT through-bolt anchors minimum for the longitudinal stop plate.
- 4 SPIT through-bolt anchors for each transverse stop plate.

5.5.6 Fixing the weighbridge onto the civil engineering structure

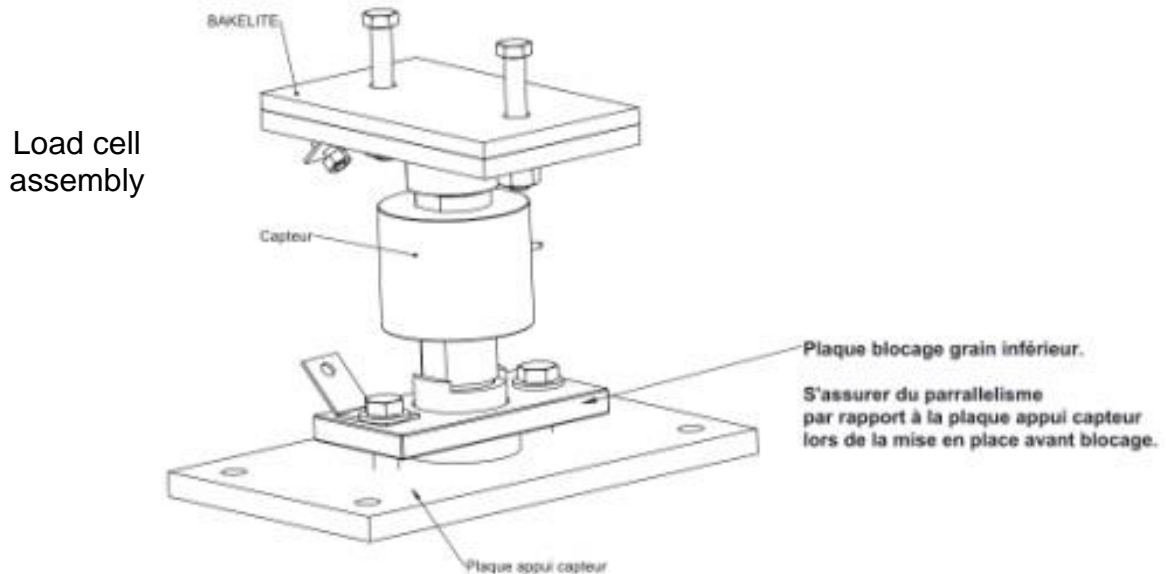
Move on to fixing the 8 load cell support plates using the M12 SPIT through-bolt anchors provided according to the same principle as the bumpstops.

- 4 SPIT through-bolt anchors per load cell support plate.



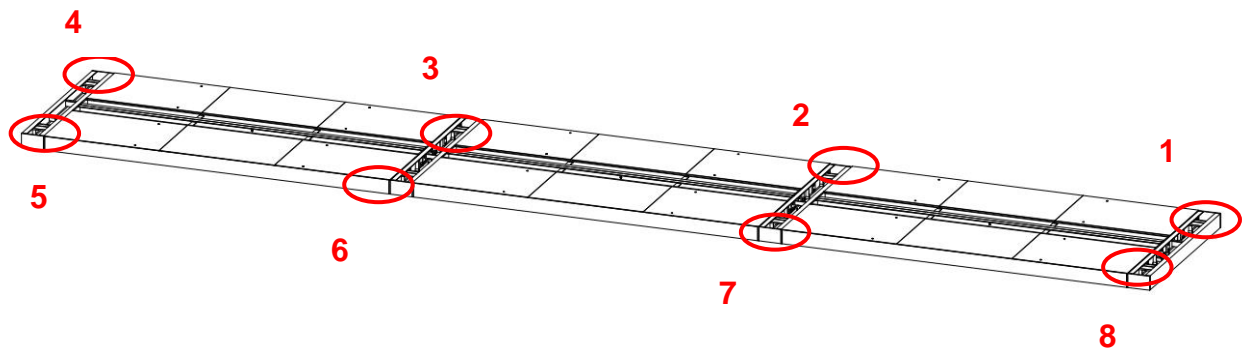
6 FITTING THE LOAD CELLS

Once all the load cell support plates have been fixed, replace the dummy load cells with the load cell assemblies. Be careful to tighten the lower flange parallel to the support plate of the load cell.



CAUTION:

The load cells are numbered in the factory. To facilitate alignment and for maintenance, the modules must be located as shown below.



6 modules = 8 load cells

Use a suitable hydraulic jack
(Roller + bevel gear if weighbridge in pit + suitable hardwood shim)

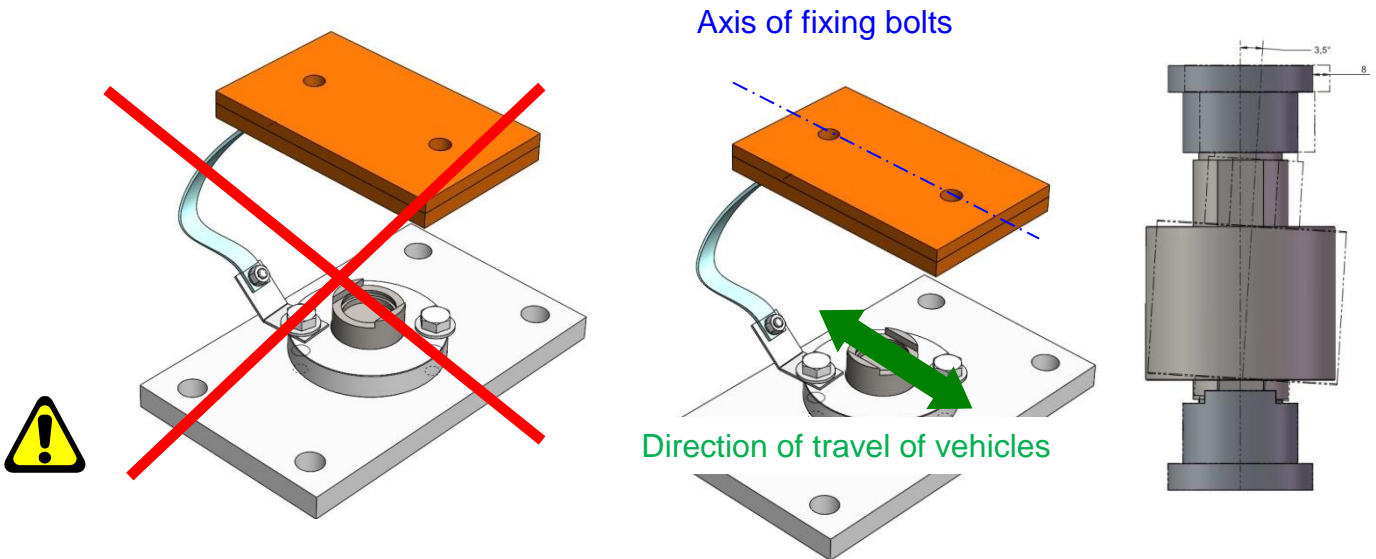


**CAUTION:**

The parts of the upper and lower dowels in contact with the load cell must be greased.

**ATTENTION WITH THE DIRECTION OF FITTING THE ANTI-ROTATION DEVICE**

The flats of the anti-rotation dowels must be orientated in the direction of vehicle movement.



Remember to fit the upper and lower earth braid connection brackets. Fit the earthing braids.

Ensure the load cell is fitted absolutely vertically by using a suitable level.

6.1 Adjustment of stops

No stop screw must be in contact with the stops in order that the weighbridge is movable.

Move on to adjustment:

Adjust the stop screws leaving a clearance of **2 mm**

Secure in position with the locknut.

Ensure that the weighbridge moves freely

The clearance must be checked after 1 to 2 months of use

6.2 Equipotentiality

Fitting the earthing braids

Fit the equipotential connection braids on the modules, and fix the connection box to the plate provided, connect the weighbridge to earth (*civil engineering structure supply*)



CAUTION: For galvanised weighbridges, only two equipotential connections are needed:

One connection between the earthing rod and the weighbridge

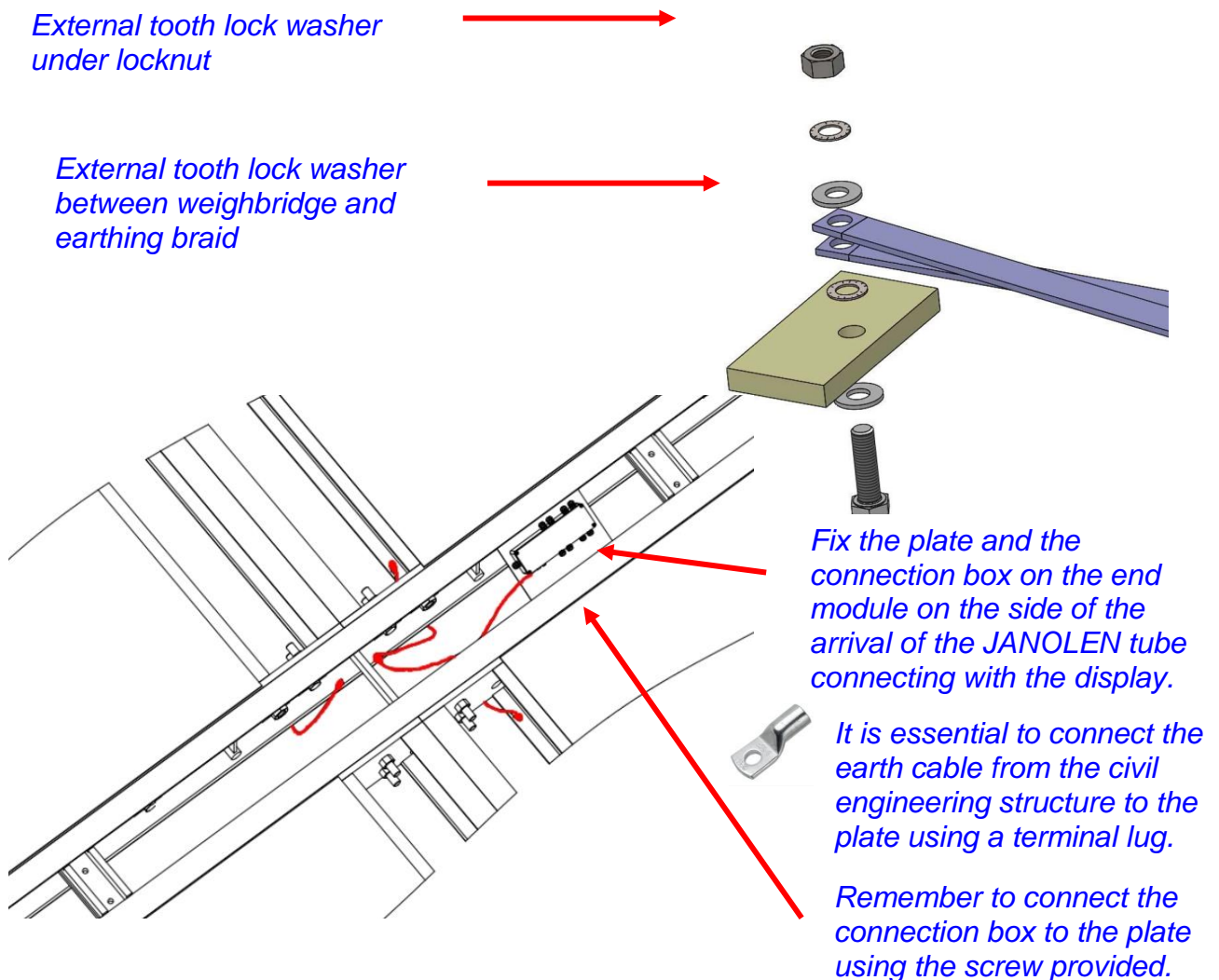
One connection between the connection box and the weighbridge



CAUTION: fit washers in the correct order to ensure low contact resistance.

External tooth lock washer under locknut

External tooth lock washer between weighbridge and earthing braid



Proceed in the same way for the other modules using the cable or earthing braids provided.

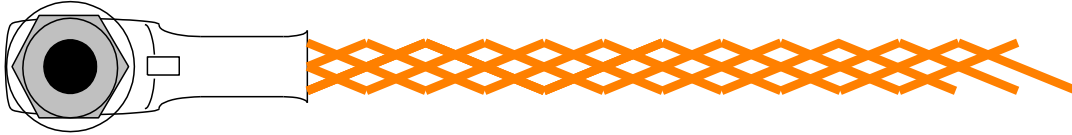
The earth cable is supplied by the customer.



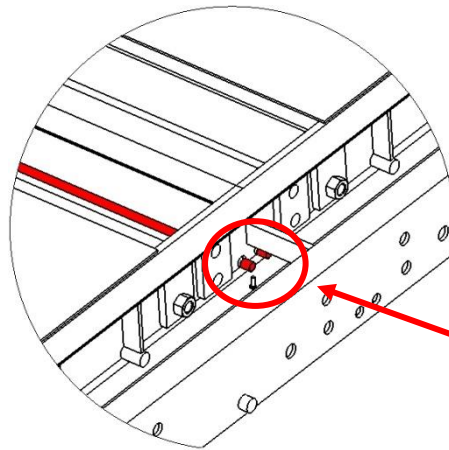
The earth must be $< 5 \Omega$

Unless specified otherwise, the earth cable is connected to the connection box fixing plate using a bolt + external tooth lock washer + flat washer + nut.

For this connection, the use of a crimped terminal is mandatory.



Sleeve positions

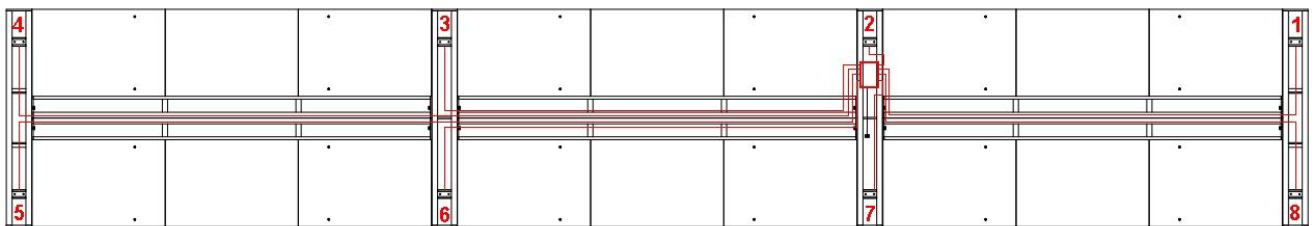


Depending on version, the wire-guide tubes may or may not be pre-positioned in the modules.

Position the wire-guide tubes by sliding them from the end of the weighbridge so that they terminate in the compartments of the central module.

(In order to protect the cables at the girder penetrations)

Feed the load cell cables to the connection box following the path below.



CAUTION:

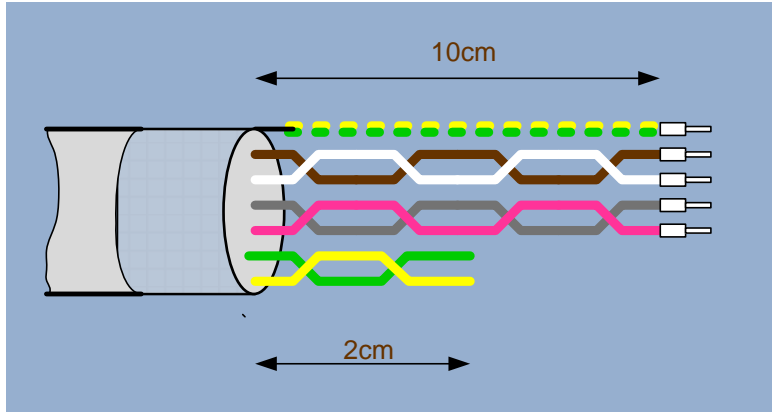


It may be necessary to guide the sleeves to make it easier to feed the cables particularly when there are two cables running down the same sleeve at the same time.

Feed the cable connected to the display in the sleeve provided.

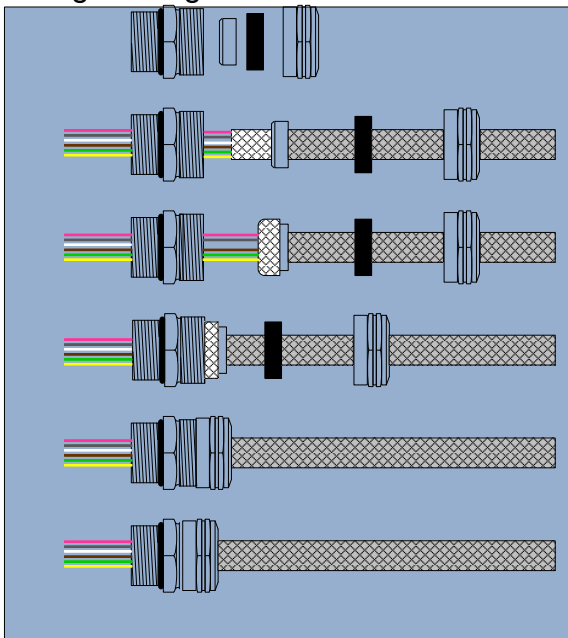
6.3 Connections

Special attention should be paid to the following:
 Preparing the cable termination:



The yellow and green wires of the load cells are not connected and the terminal ends must be crimped with the end sleeve crimping pliers.

Fitting cable glands.



The cable screen should preferably be connected at the cable gland, by default, the "yellow/green" wire must be connected to the GND of the load cell terminal block.

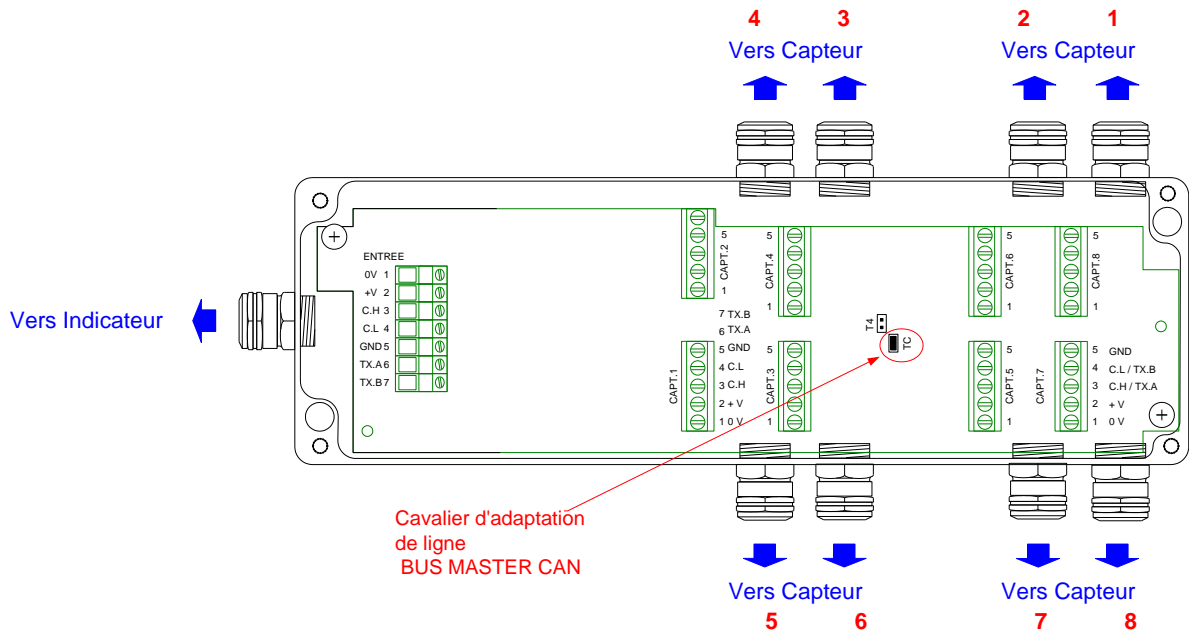


Unused cable glands must be sealed:

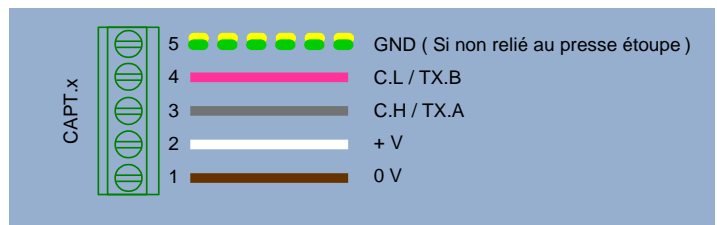
Blank rubber ring or plastic plug, or replace the cable glands by screwed plugs (not supplied).

Cable glands must be fully tightened on the plastic cable sheath, in no case on the metal sheath.

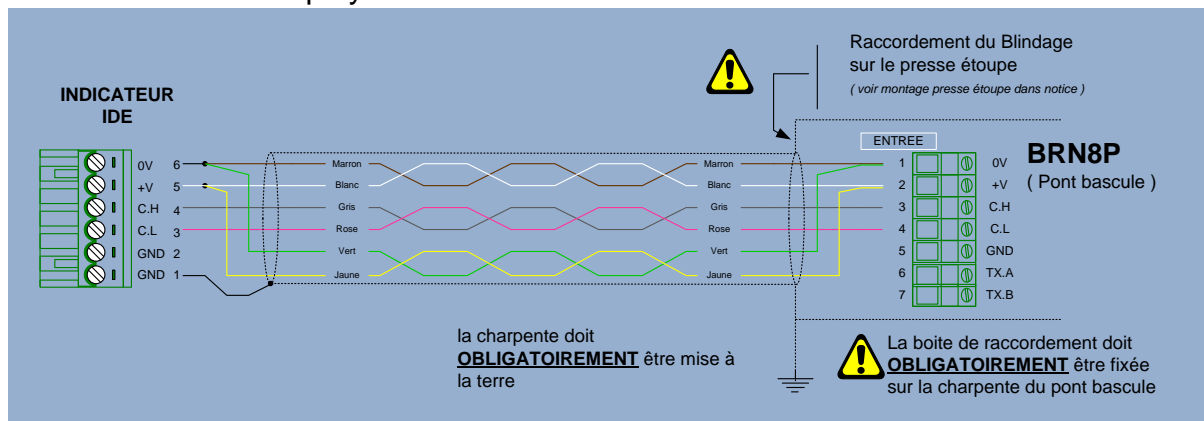
BRN8 P (Connection and protection box).



Connection of digital sensors



Connection of the display link



Line impedance matching

A line impedance-matching resistor (120Ω) must be connected at each end of the **CAN** network. (*Line plug*).

The "TC" line adaptation jumper must be positioned on the BRN8 P board. (*Only if the connection box is one end of the CAN network*).

First power up

Connect the measurement cable to the weighing display.

Check the operating voltage (230 VAC) with a multimeter

Check the voltage between neutral and earth with a multimeter
(*A few volts*)

Check the voltage between phase and earth with a multimeter (230 VAC)

If all voltages are correct, power the display on.

If all load cells are recognised (see display manual)

Power off

Grease the threads of the connection box closure screws

Close the connection boxes ensuring the wires are not trapped by the cover

Ensure that the connection box is earthed.

Installation of the closure plates on the central section

Once the sensors are installed, the central section can be closed except around the connection box.

Closure of the load cell trap doors

Fit the load cell trap doors.

Copiously grease the countersunk Allen screws holding the trap doors in place using a water-resistant grease. (*Graphited grease or aluminium grease or equivalent*).

Power back on and carry out adjustments if necessary.

7 MECHANICAL CHECKS AFTER ENTERING SERVICE



After several months of use, carry out a mechanical inspection as follows:

- ⇒ Tightness of the anchor plugs holding the support plates.
- ⇒ Tightness of all mounting bolts of the weighbridge.
- ⇒ Tightness of the load cell fixings in the upper and lower sections.
- ⇒ Clearance and tightness of the longitudinal stops.
- ⇒ Clearance and tightness of the transverse stops.
- ⇒ Tightness of the earthing braids particularly at the connection box.

8 APPENDIX

8.1 List of hardware 14,16,18m weighbridge

- Gangway.	X6	
- End weigh bar.	X2	
- Central weigh bar.	X2	
- Clamping backing plate	X36	
- Longitudinal stop plate	X1	
- Transverse stop plate	X2	
- Load cell support plate	X8	
- Lower load cell flange	X8	
- Shim th. 1mm	X8	
- Shim th. 2mm	X8	
- Dummy load cell.		X8
- CPFN-A30t load cell.	X8	
- Lower dowel	X8	
- Upper dowel	X8	
- Earthing bracket	X16	
- Earth braid	X8	
- Insulating plate th.10	X8	
- Insulating plate th.12	X8	
- Connection box	X1	
- Indicator according to order	X1	
- "Ordinary rigid insulation" PVC wire-guide tube		X36m
- Connecting cable	X50m	
- Earth cable	X4m	
- M14 lifting bail.	X1	Trap door handling
- M24 lifting bail.	X4	Gangway handling
- Anchor bolt dia. 20.	X20	Stop plates
- Anchor bolt dia. 12.	X32	Load cell support plate
- M30 stop screw, 2 mm pitch	X8	
- M30 Nut, 2 mm pitch	X8	
- M24 x 70 hex-head bolt		X18 Gangway fixing
- M24 x 100 hex-head bolt		X72 Raft fixing
- M24 flat washer	X90	Gangway & weigh bar
- M24 GROWER washer	X90	Gangway & weigh bar
- M24 nut	X18	Gangway
- M14x45 hex-head bolt		X16 Lower fixing, load cell
- M14x80 hex-head bolt		X16 Upper fixing, load cell
- M14 flat washer	X16	
- M14 external tooth lock washer		X32
- M14 nut	X16	
- M12x25 hex-head bolt		X136 Trap door fixing
- M8x16 hex-head bolt		X40 Earth braid fixing
- M8 flat washer	X40	
- M8 nut	X40	
- M8 external tooth lock washer		X40