

T95 Load Cell Assembly for Silo, Tank & Vessel Weighing and Axle Weighing

Capacities 2t to 20t



- Stainless Steel Load Sensor
- OIML C3 approved
- Integrated Lift Off Prevention
- Load cell is always in Tension
- Five Year Warranty
- Resistant To 'Off Axis' Loading
- Unique damping feature
- Fully Welded Construction to IP68 and IP69K
- ATEX certification for all gas and dust zones
- Allows Vessel Expansion & Contraction
- Painted or Stainless Steel Mounting Assembly

Vessel and axle weighing problems solved simply and cost effectively. The T95 is particularly suitable for high accuracy applications, where movement or vibration is present. The load point is always maintained through the central axis of the load cell, even when the assembly is subjected to considerable movement or misalignment.

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1. T95 Description and Principle of Operation

The T95 is essentially a complete compression load mount assembly which benefits from the fact that the load cell is loaded in **tension**. This unique design ensures that the load point is always maintained through the central axis of the load cell, even when the assembly is subjected to considerable movement or misalignment.

This offers all of the performance advantages of tension mounting with the compactness and security of a compression design.

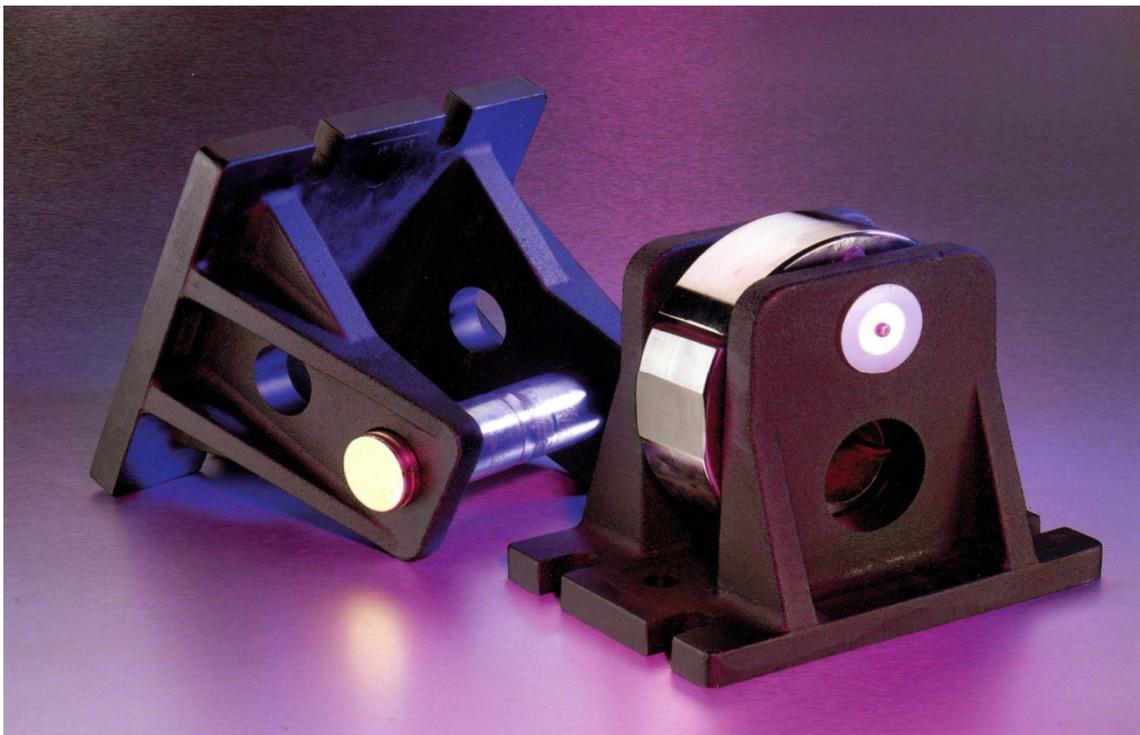
The self-centring, energy restoring design of the mounting assembly means that this product is ideally suited for applications in weighing vessels with mixers/stirrers and for vehicle axle weighing.

When fitted correctly, the assembly automatically returns to its original position after external forces are removed from the system.

When correctly aligned in an axle-weigher, the assembly acts quickly to dampen the motion caused by vehicle movement or braking. A similar result is achieved when the loading assembly is fitted to mixing vessels, absorbing forces generated on start-up or stopping and also accommodating any vessel movement.

The design of the mount protects the load cell from end load and side load. Lift off is prevented without allowing any shock loading of the load cell.

2. Assembly Guidelines

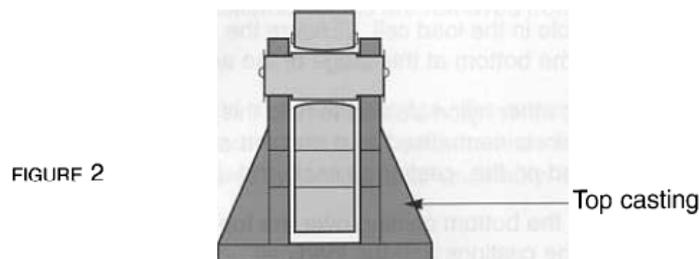
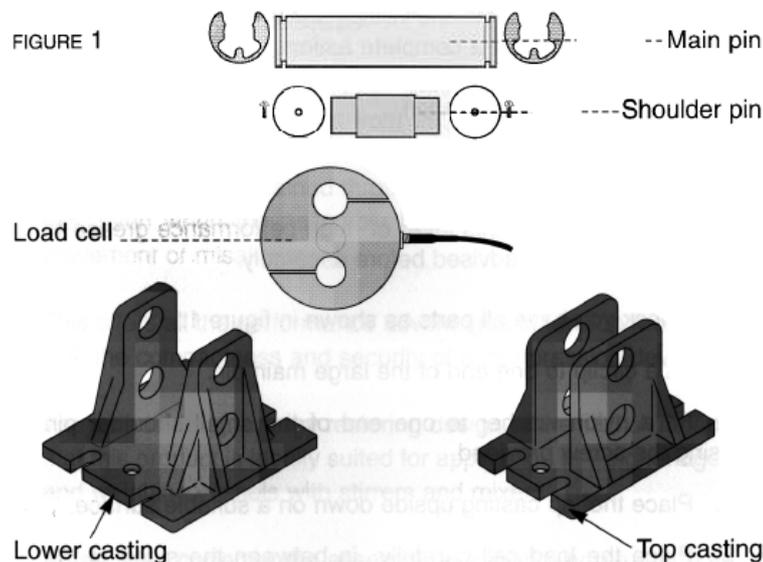


One of the advantages of the T95 is that it can be fitted to the weighing structure as a complete assembly and therefore, for most applications, it is suggested that the units are fully assembled prior to installation. This negates the need for dummy load cells, keeping cost down and reducing installation time.

The application of a thin layer of performance grease to the loading pins is advised before assembly.

1. Check you have all of the parts as shown in Figure 1.
2. Fit a circlip to one end of the large pin.
3. Fit a nylon washer to one end of the small pin using the screw provided.
4. Place the top casting upside down on a suitable surface.
5. Place the load cell carefully between the cheeks of the top casting and slide the small pin through the casting and the smaller hole in the load cell (ensure that the larger hole in the load cell is at the bottom at this stage of assembly).
6. Fit the other nylon washer to hold the pin in place, ensuring that the pin is centralised and that the smaller diameter ends are located on the casting at each end (see Figure 2).
7. Place the bottom casting over the top casting and align the holes in the castings and the load cell. Carefully insert the large pin through the whole assembly and fit the second circlip.

PARTS LIST



3. Handling and Storage

Care should be taken when handling the completed assembly - remember that the 20 tonne unit weighs in excess of 50kg.

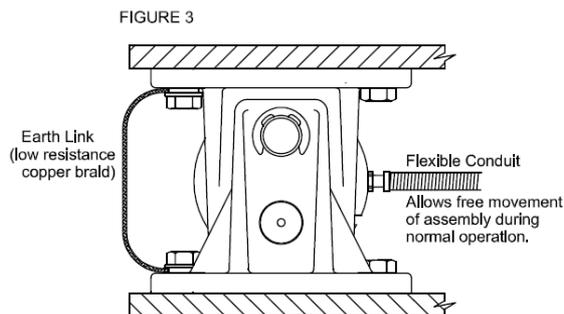
If the units are assembled away from the site application, suitable packing should be provided during transportation to avoid damage. Although the assembly is robust, accidental damage can occur to the load cell cable outlet during handling and fitting.

If units are stored prior to fitting, they should be kept in a dry place and attention must be paid to the storage temperature limits of -40° to $+80^{\circ}\text{C}$.

4. Cable Protection

Once the assembly has been installed, adequate mechanical protection for the cable should be provided, such as a suitable conduit.

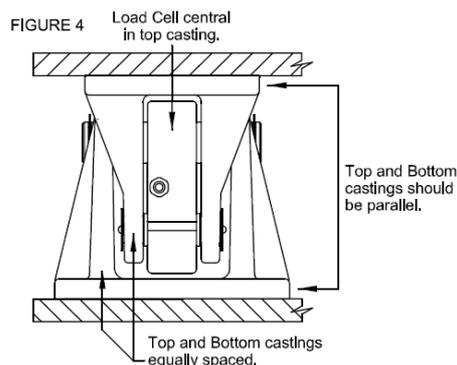
Note that, unlike many other loading assemblies, the T95LA relies on the load cell being free to move during operation. Any cable protection must be of a flexible nature and must not impede the movement of the load cell (see Figure 3).



5. General Fitting Guidelines

5.1 Alignment

For optimum performance, the T95 should be installed so that the load cell is central and parallel between the sides of the top casting. Also, the top casting should be centrally located in the bottom casting, with equal clearance on either side. Errors will be introduced if the cell or castings are allowed to rub against each other. To facilitate this during installation, non-metallic spacers (e.g. nylon) can be used to ensure parallel alignment (see Figure 4).



5.2 Fixed Base

Although the T95 can tolerate misalignment between the base and the weigh structure, it is advisable to ensure that any supporting base is as level as practically possible.

The bottom casting of the mounting assembly should be bolted through a steel spreader plate to a suitable concrete base using M14 bolts.

The use of grout between the spreader plate and the concrete base can facilitate levelling alignment, if necessary. See Figure 5 for more details.

Note that if the T95 units are fitted on a regular basis, the use of dummy mounts is recommended. These can be simply fabricated using the overall dimensions and hole locations of the specific T95 model being fitted. All levelling and alignment procedures, as well as any necessary welding, can be carried out with the dummy mounts in position before their removal and replacement with the live T95 load cells.

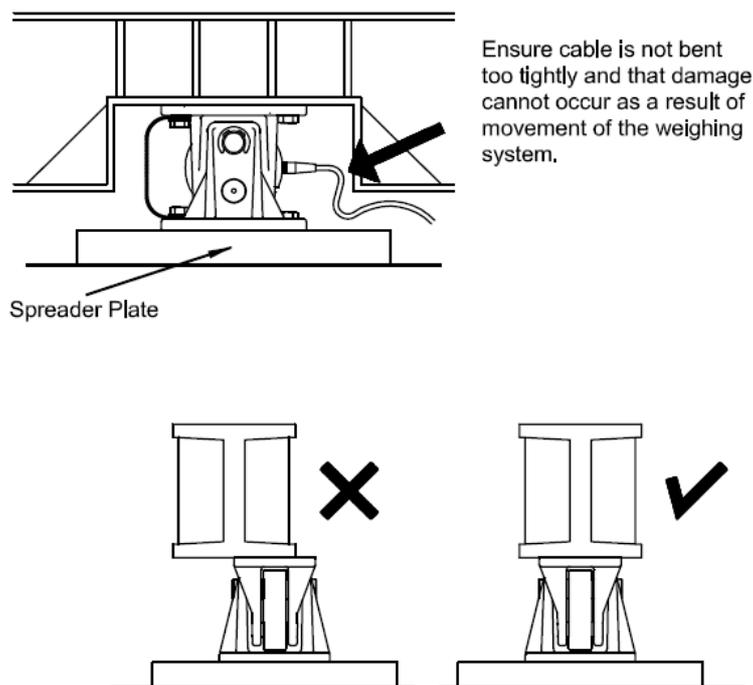


Figure 5 – T95 installation guidelines

5.3 Steel Superstructures

If the T95 is mounted on elevated steel structures, any support beams must be of sufficient stiffness. Additional cross bracing and stiffening gussets should be provided as necessary.

5.4 Fixing Bolts

When tightening fixing bolts, care should be taken that the bolts are not used to pull together mating surfaces that are not properly aligned. This can put

unnecessary strain on the load cell assembly, which can cause poor performance and possible premature failure.

Under normal zero live load conditions on the weighing structure, all of the loading assemblies should be measuring;

- a) Similar load
- b) Positive load

If one of the cells is not loaded under these conditions, then erratic results will be experienced as load is applied.

5.5 Overload

The T95 is designed to accept static loads up to 150% of the load cell rated capacity. However, under no circumstances should the overload range be used for regular operation.

If shock loads are anticipated in a particular application, suitable additional protection should be provided to the weighing system.

Note that adjustable mechanical overload stops are usually ineffective for this type of application, due to the very small deflection of the T95 assembly.

Further advice is available on request.

5.6 Environmental Considerations

The T95 load cell and mounting assembly are suitable for continuous outdoor use. However, the unit should not be allowed to be submerged in water for prolonged periods and adequate drainage facilities should be provided.

For corrosive environments, especially in areas where chlorine or acids are present, the load cell can be ordered with a special 'Parylene' coating applied; this will protect it from stress corrosion.

High temperature variants are also available, which incorporate special internal components and a PTFE cable to allow operation up to 150°C.

6. ATEX Certification

The T95 is also available with intrinsically safe certification as follows:

Certificate Number	Code	Safety Parameters	Key Points
05 ATEX 2251	II 1 GD Ex ia IIC T6 Ga Ex ia IIIC T70°C Da	U _i = 30 V P _i = 1.3 W C _i = 2.4 nF L _i = 8 µH	CATEGORY 1 EQUIPMENT Products covered by certificate 05 ATEX 2251 are suitable for use in all zones (Gas 0, 1, 2 and Dust 20, 21, 22) but require safety barriers; they also have the highest available temperature classification (T6).
06 ATEX 4345X	II 3 G Ex nA T6 (T _a = -20°C to +60°C)	U _i = 30 V, P _i = 1.3 W C _i = 2.4 nF, L _i = 8 µH	CATEGORY 3 EQUIPMENT Products covered by certificate 4345X are type 'n' certified and only suitable for Gas Zone 2. Code X denotes that the input voltage to the Load Cell must be protected from transient disturbances of more than above the input voltage of 30 V. These load cells do <u>not</u> require safety barriers
11 ATEX 9293	II 1 D Ex ta IIIC T80°C Da IP6X T _a = (-20°C ≤ T _a ≤ +60°C)	U _m = 18 V	CATEGORY 1 EQUIPMENT Products covered by certificate 9293 are for use in all Dust zones, which are 20, 21, 22 (NOT Gas Zones 0, 1, 2) without the use of safety barriers. The limitation is that the excitation voltage must be less than 18 Volts. There is no limit on the cable length and they can be used in an ambient temperature range of -20°C to +60°C.

7. Maintenance

Regular routine maintenance can greatly improve the life of your weighing system and can also ensure continual high performance.

The load cell and mounting assemblies should be regularly inspected for signs of corrosion or build up of debris.

If problems do occur, then careful cleaning can prevent further deterioration. However, care should be taken to identify the source of any corrosive substance such as leaking pipes or build-up of process material around the mounting assembly.

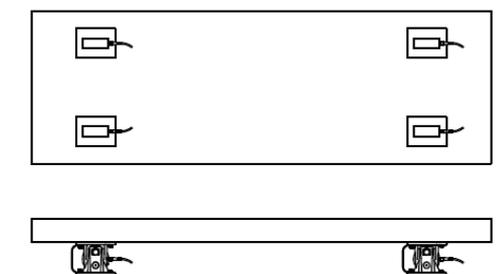
8. Specific Applications

8.1 Axle Weighers

The T95's unique design makes the product ideal for weigh-in-motion systems and axle weighers (see Figure 6). Operational forces on a typical axle weigher are in the direction of travel of the vehicle. To ensure the design of the T95 is used to its best advantage, the units should be oriented so that the load pins are at right angles (90°) to the direction of travel. The recommended maximum beam deflection for the structure, to ensure best performance, is 1mm per 1000mm at the rated load (see Figure 7). Care should also be taken to ensure that the free movement of the system cannot stretch or damage the load cell cables.



Figure 6 - T95 load cells fitted on a Weigh-in-Motion system



Recommended MAX beam deflection 1mm per 1000mm at rated load.

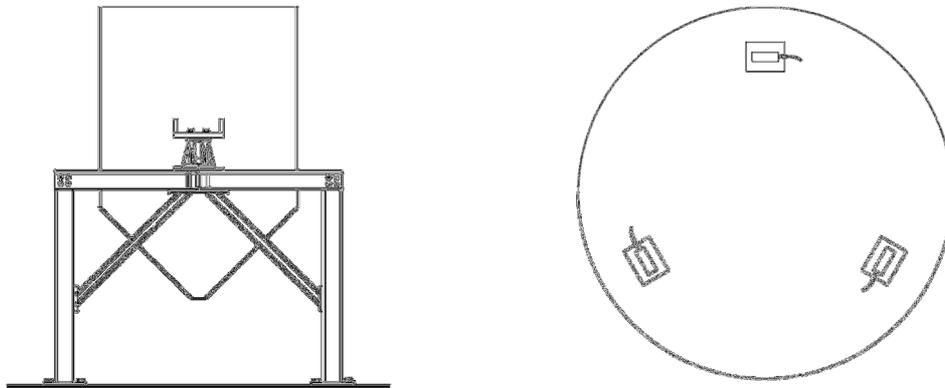
Figure 7 – maximum recommended beam deflection

8.2 Hoppers, Tanks, Silos and Mixers

The number of loading assemblies required will depend on the design of the vessel to be weighed. Typically 3 or 4 point systems are most common, with 3 being preferred in order to avoid shimming. To achieve the greatest accuracy with horizontal or cylindrical vessels, load cells should be mounted under all supports.

The loading assemblies should be fitted so that the loading pins are orientated towards the centre of the vessel. This arrangement works equally well for both

static applications and for systems that incorporate stirrers or agitators. The self-centring nature of the assemblies counteracts any forces that may be generated when such devices start up or change speed.



ARRANGEMENT FOR LONG HORIZONTAL TANK.

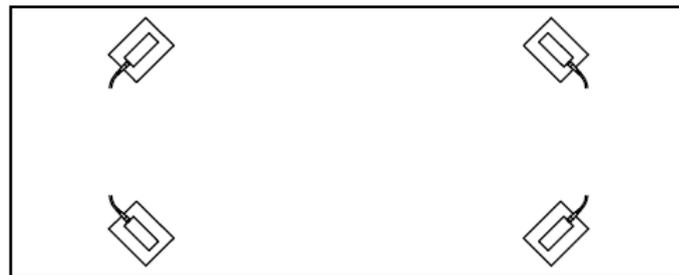


Figure 8 – recommended load cell arrangement for silos, tanks and mixers

To determine the correct capacity requirements of T95 load cells:

- Determine the empty weight of the vessel, including any fixed equipment such as motors, agitators and piping. This is generally known as the **DEAD WEIGHT** or **TARE WEIGHT**.
- Determine the weight of the **MAXIMUM** contents of the vessel, not the normal or operating capacity. This is usually referred to as the **LIVE WEIGHT**.
- Add these two figures to obtain the **GROSS WEIGHT**. Divide this figure by the number of vessel support points. The resulting number is the **ABSOLUTE LOWEST** capacity cell that should be specified. In general, no more than 80% of the cell capacity should be utilised, in order to accommodate possible unequal load distribution, errors in weight estimates, and the effects of agitators, mixers, wind forces and shock loading. If extreme environmental factors are to be considered (such as high wind loading or seismic effects) it may be necessary to incorporate load cells of a higher capacity.

Although the T95 has built in lift-off protection, it is advisable to fit additional mechanical protection on tall silos, especially in areas of high winds or seismic activity. Ensure that any such restraints do not interfere with normal weighing operations.



Figure 10 – examples of T95 load cell installed on silos/tanks

9. General Dos and Don'ts

The task of keeping your Thames Side T95 load cell in good condition begins well before it is fitted on site.

It starts by making sure that you choose the correct load cell for the application and that it is designed into your system with care and forethought.

The following Dos and Don'ts are intended as a brief guide to keeping your load cells working perfectly. Of course, our application engineers and sales personnel around the world are always available to discuss these matters in more detail to help you ensure trouble free weighing – year in, year out.

Do

Select the right load cell for the application in terms of type and environmental sealing.

Choose the correct capacity.

Choose the required accuracy overall system class.

Don't

Make the choice only on price:
– cost of ownership is more important.

Allow load cells to operate above their rated capacity – you should use load cells only up to a maximum of 80% of their capacity.

Over specify. Look at the limitation on accuracy due to a e.g. mechanical issues, pipework, vibration etc.

10. Dimensional Details

