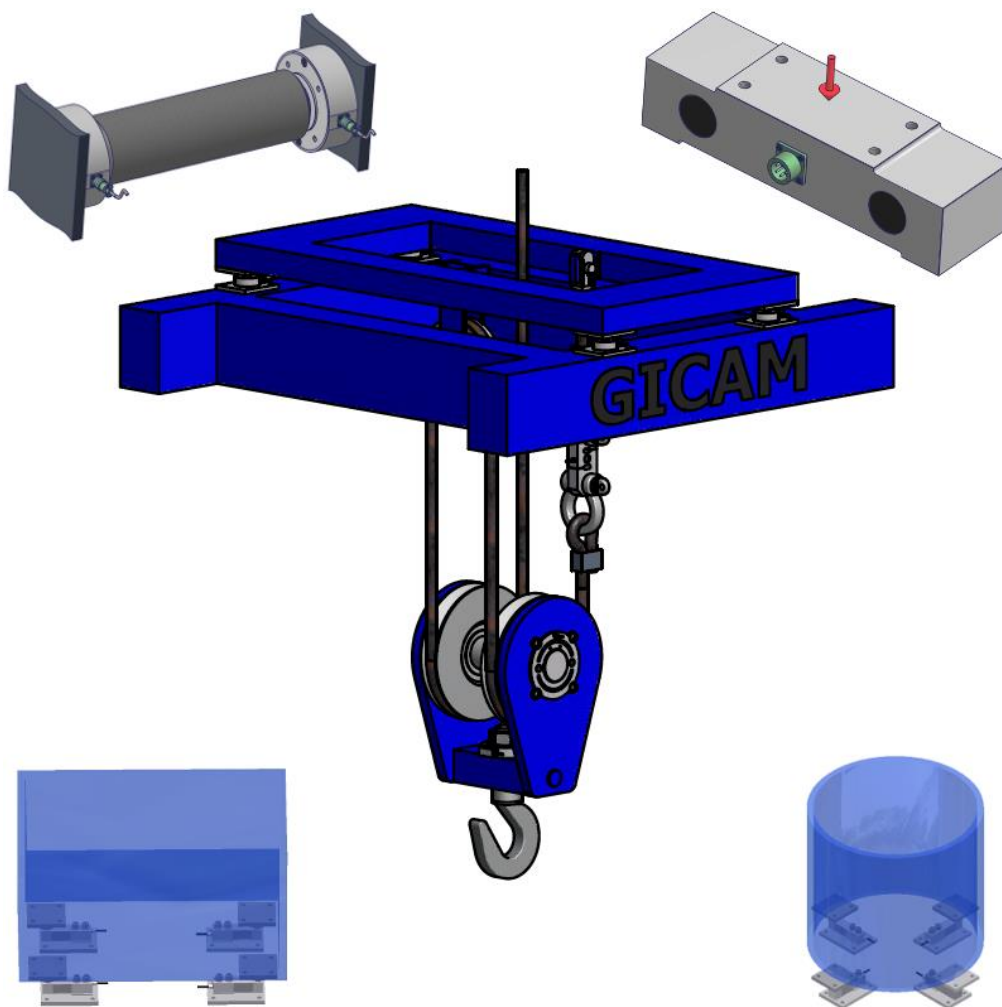




INSTALLATION & MOUNTING MANUAL

GICAM MANUAL (Vers. 1.0)

Data 12/05/2015

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GENERAL DESCRIPTION

Load cells can be used for the weighing of silos, tanks, hoppers, platforms etc. installed in different configurations.

There are some considerations and specific aspects to evaluate, if you desire accuracy, repeatability and stableness of the weighing systems over time. Load cell measures force that is exerted on vertical axis. The errors that may occur are:

- Forces or Lateral thrusts
- Torsion.
- Misalignment of the load.
- Time (particularly for cells in tension).
- Vibrations transmitted to the load cell.

In systems with cells in tension the upper and lower attachment must not be subject to twisting (rotation) and should be as far as possible aligned with the force to be measured. In systems with compression load cells the supporting base serves to give the reaction and rigidity to the applied force, while the upper plate compensates within certain limits (approximately 1 mm/meter) any non-verticality of the load and/or differences of parallelism between the upper and lower plates.

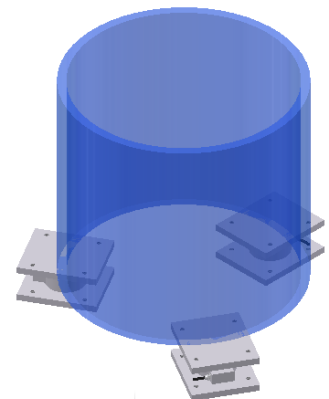
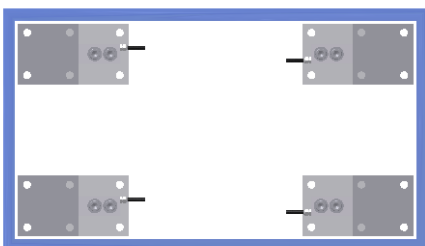
LOAD CELLS & ELECTRONIC WEIGHING SYSTEMS

The first choice to make relates to the type of load cell to be used.

Generally, the choice depends on accuracy and reliability of measurement, but also depends on the mechanical aspect of the whole system.

For example; if you want to weigh a horizontal cylindrical tank (right Image), mounted on concrete slab, the choice will be compression load cell.

If you want to weigh a hopper (left image) within an industrial complex where there is an overhead rigid structure, the obvious choice would be to employ one or more tension load cells.



If there is a convenient and cost effective way to suspend the weighing unit and if the capacity of the latter does not exceed 15 tons the choice of tension load cell is reliable, accurate and economic. When the structure exceeds 15 tons or impractical to suspend the structure to weigh you will use compression load cells.

In the selection of the points of support and especially in weighing systems of large tanks you must take into account the elasticity of the structure. In the presence of vibrations, the structures tend to react with their natural frequency creating instability to the measuring instrument. In these cases, it is important resizing rigid structures whose natural frequency will be at least 1/100 of the expected frequency in load-bearing structures due to vibrations.

WEIGHING SYSTEM WITH MECHANICAL FULCRUM

In some solutions the weighing operation is distributed among load cell and mechanical fulcrum. These systems are usable only with uniformly distributed load, as in the case of liquids. If the load cell installed at

one end and the fulcrum at the other, the cell receives only a part of the load. It will receive 50%, if the distance between the center of gravity and the fulcrum is equal to the distance between the center of gravity and the load cell. This solution offers excellent results in terms of accuracy while being rather inexpensive.

The structure to be weighed must be perfectly horizontal and particular attention must be paid to achieve a perfect symmetry between the center of gravity and the mounting points of the load cell and mechanical fulcrum. The center of gravity of the material contained in the hopper or tank must be strictly constant. This weighing solution is for liquids only.

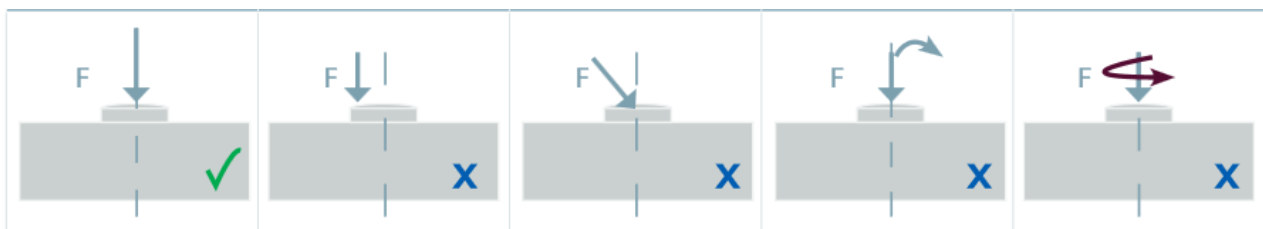
In the case of solid materials or powder these tend to form "cones", therefore the center of gravity is subject to continuous variations that result in a different weight distribution between load cells and mechanical fulcrum. The accuracy that can be obtained with a similar solution can be between 0.5% and 1%. The error is of a practical nature since it is difficult to obtain a mechanical structure that has lower dimensional tolerances.

These systems must be used when the economic aspect prevails over the measurement accuracy. To obtain measurements of higher precision we will obviously choose a system totally based on load cells.

LOAD CELL APPLICATION METHODS

Tension load cells are mounted using bolts that are inserted on either end of the load cell. There are always slight movements between the supporting structure and the load due to various reasons. If the attached bolts are short they may create slight lateral push or torsions that may cause substantial measurement errors. It is therefore preferable to use extension rods of a certain length that minimizes the measurement error.

For compression load cells the best way is to have 100% verticality of the load in order to achieve a perfect parallelism and horizontality between the ground plane of the load cell and weighing surface structure.



Apply the load to the cell, which will have a top plate of suitable hardness, in order to avoid leaving a permanent dent on the back plate of the load cell. The upper plate made of tempered steel allows a slight sliding on the horizontal plane such as to compensate, within certain limits, any lateral thrust due to thermal expansions. It is equally important that the lower plate has an appropriate thickness. The load cell operates in optimum conditions if the base is rigid. Otherwise, the elastic nature of the resting point will create a measurement error and the phenomena of poor repeatability.

CONTAINMENT OF LATERAL THRUST

Since the load cells are not designed to limit the lateral thrusts it is appropriate to provide for each weighing system, a series of rods designed and constructed for this purpose. The lateral thrusts are caused by different factors such as wind, settling of mechanical structures and walls, blows taken from the fall of

materials into the hoppers, accidental blows caused by external means such as carriages, winches, thermal expansion of facilities, etc.

To prevent these movements tie rods that work in two directions (X and Y). As a general rule it must oppose the movements in the two directions X and Y with two tie rods in the direction X, plus two tie rods in the Y direction, arranged at 90° between them, which are connected to the reservoir fixed to the structure. In this way if the temperature varies, the reservoir is free to expand in the direction XY without producing effects of rotation. If the tie rods are placed in opposite directions, one can generate the lateral thrust, which can cause rotation of the tank.

VERTICAL DEFORMATION

It is good to keep in mind that a weighing system must have the load totally borne by the load cells. There should be no mechanical constraints that support the load. The vertical deformation of the load cells is about 2/10 mm, therefore any constraint that is opposed to this deformation generates error in the measurement system.

TEMPERATURE EFFECTS

The load cells are compensated for variations between -10° and 60° C. It is necessary to avoid load cells being subjected to direct radiation of heat from kilns, sun, light reflection, steam, hot air, etc. In the presence of these or other sources of heat it is better to have barriers with thermal insulating material or reflective, such as mirror sheets, and try to have all the load cells at the same temperature within a particular weighing system. Dirt, grease, dust etc., may cause a different heat absorption by the load cells. The cells must never be employed at temperatures higher than 65° C and must not be subject to sudden temperature variations.

MOUNTING OF THE LOAD CELL

General precautions to be followed in the installation and mounting of load cells:

- Follow the direction of application of force on the load cell.
- Do not exceed the limits of the temperature as indicated in the data sheet.
- Do not remove product tag from the load cell.
- Adequately protect the cables with sleeves or channels.
- Attach on each load cell a ground connection to the mounting accessories.
- Do not carry out any welding on the mechanical structure after mounting the load cell.
- Avoid or reduce to a minimum level any mechanical constraints between the rigid structure and the weighing structure to avoid error in weighing and return to zero.
- In case of vibrations or dynamic loads, protect the load cells with puffers / shock absorbers.
- Protect load cell from any dust accumulation with any appropriate means.

Specific arrangements based on the type of load cell used are listed below.

Mounting of Compression load cell: The supporting plane for the load cell must be perfectly horizontal and coplanar. The structure must be sufficiently rigid to maintain the horizontality of assembling plane.

Mounting of Off-center load cell: Position the anti-overload mechanical stops under the load cell and in the corners of the structure, bearing in mind that in the corners the weight applicable is 1/3 of the nominal load.

Mounting of Tension load cell: The tension load cell must be attached to a sufficiently rigid structure and must be mounted in such a way as to support the load on vertical axis.

Mounting of Double Shear Beam load cell: Fix the cells using screws or bolts with adequate mechanical strength. The load must be perpendicular to the point of application.

Mounting of Flexion or Shear Beam load cell: For flexion or shear beam load cells consideration must be made for mounting of the load cell by compression. A mounting accessory is available that performs the function of absorbing the lateral thrusts, shocks and vibrations.

Mounting of Load Pins: When mounting the load pin at the shoulder of the housing pay careful attention to the cable and the cable gland. Do not use a hammer or other means of force to mount the pin.

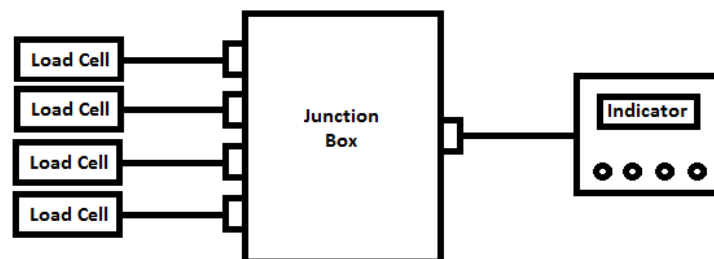
ELECTRICAL CONNECTIONS

A system of modular weighing requires two types of electrical connections:

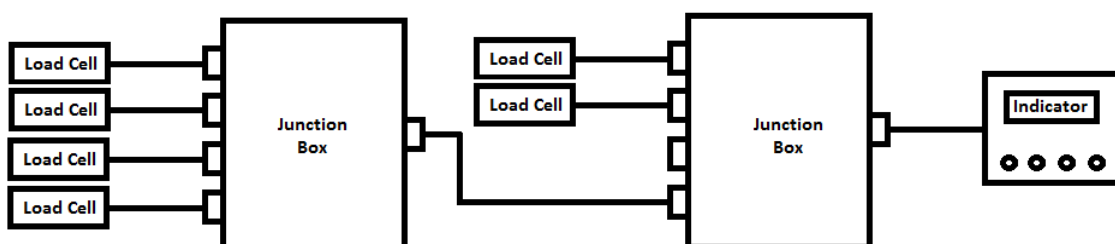
- Cables that connect each load cell to a junction box (the cables are generally provided with the cells themselves).
- Cables for direct connection to electrical switchboards/Junction Boxes.

LOAD CELL CABLES

Each load cell is connected via a cable to the junction box, that sum the signals of each load cell to provide a signal that can be transmitted to the indicator. The analog mode of operation is the most common, but there are load cells that provide digital output signal. When using a digital system, refer to the Technical Manual of the supplier for the wiring of the appropriate junction box.



The majority of weighing systems use an analog junction box, which requires an analog indicator compatible with the signal. An analog junction box can add up to four load cells. For weighing systems with more than four load cells, it is necessary to connect more junction boxes together. The maximum number of load cells in a weighing system depends on the power requirement of the indicator and the resistance bridge of the load cells.



LOAD CELL CONNECTIONS

Generally, each load cell is supplied with a standard length cable. Do not lengthen or shorten the cable of the load cell onsite. Changing the length of the cable will affect the output signal from the load cell. If a cable is too long, simply wrap the excess cable and place it in the junction box or in the immediate vicinity. Do not attach the excess cable to an active section of the weighing system.

A home run cable transmits the signal from the load cell to the junction box and from the junction box to the indicator. To provide accurate readings, a cell must be able to distinguish between electrical signals, which differ from a millionth of a volt. In signals so small the disturbance introduced through the cables may cause errors in the weighing. The common sources of disturbance are in radio frequency (RF) and electromagnetic (EM), produced by power cables, electrical lines, engines or mobile phones.

Ways to prevent electrical interferences are:

- Install the cables at least 12" from the electric lines.
- Completely isolate the ground cables to prevent them from receiving unwanted disturbances.

The cables are often exposed to mechanical damage or damage caused by water or chemicals. To protect the cables from damage, enclose them in a flexible duct. Teflon coatings are available to protect the cables in corrosive environments.

The load cells have four or six wires cable. The cable with four wires is calibrated and temperature compensated to a certain length. The accuracy of the cell, in terms of thermal stability, will be compromised, if the cable is cut; never cut a load cell cable with four wires.

A load cell cable with six wires is provided with two additional wires that can be used to sense the actual voltage to the cell in order to provide this information to the indicator. A load cell with six wires is not part of the system of compensation of the temperature and the cable can be cut to the desired length. However, it must be noted that the parallel connection of several load cells with six wires cable causes a potential difference between all the cells. As such all load cells cables should be shortened to the same length.

GICAM LOAD CELL CABLES

Gicam load cells are provided with three different types of cable.

CABLE PVC FR20H2R 4 x 0,25: colour code White / Green / Red / Black, black sheath



CABLE PVC FR20H2R 6 x 0,25: colour code Yellow/Green/Red/Blue/Black/White, in grey or black sheath



CABLE PVC FR20H2R 6 x 0,35: colour code Yellow/Green/Red/Black/Blue/White, in grey sheath



INSTRUCTIONS FOR USE OF ATEX CERTIFIED LOAD CELLS

COMPRESSION / SHEAR BEAM / OFF-CENTER LOAD CELLS

INSTALLATION & PREPARATION OF PERSONNEL

The personnel that installs, maneuvers and manages the maintenance of these equipments or that work in places where there is a risk of explosion due to the presence of gas, vapors, mists or combustible dusts, must be qualified and trained with regards to the precautions and procedures to be implemented to reduce or eliminate the risk of explosions.

It is the responsibility of the user to observe the above in accordance with the requirements of the rules and legislations.

These instructions provide additional information necessary for the correct use of the product in places with risk of explosion.

SECURITY INSTRUCTIONS

The field of use of the load cells is the one described in this manual; performance of same are guaranteed only within the limits reported here.

The use of the product in a manner, which does not meet these requirements will void any liability of the manufacturer with regards to the performance of the product.

The damage of any part constituting the load cells can result in the loss of the ability to reduce the risk of ignition of a potentially explosive atmosphere.

The product at the time of sale, has a product tag on it for declaration of conformity as per the manual: This product tag must be stored and preserved at all times.

The installation, use and maintenance of the load cells are in part governed by the guidelines in this manual and in part contained in the rules applicable to installation and verification in places where there is danger of explosion EN 60079-14, EN 60079-17, EN 61241-14, EN 61241-17.

The electrical connection of the load cells must be implemented in accordance with EN 60079-14 and EN 61241-14 and performed with accessories, devices and methods adapted to the installation zone.

The load cells, in the case of use in potentially explosive atmospheres must be protected by a suitable fuse or protection device with not automatic reset conforming to IEC 60127 (or NE 60127) or to IEC 60691 (or EN 60691) with tripping current equal to $I_n = 1A$ and breaking capacity in current equal to $I_b = 4000$ and power to break in voltage $V_b = 250V$, in the case of electricity networks or distribution system with a rated voltage not exceeding 250V. The maximum supply voltage is equal to 15Vdc.

Observe the direction of force application to the load cells, avoiding stresses and mechanical stresses that might compromise the integrity of the load cells and reducing to a minimum any mechanical constraints between the plane and the weighing structure, to avoid defects of weighing and return to zero.

Do not exceed the limits of the temperature reported in the Product Tag.

Do not remove the Product Tag from the load cells.

To adequately protect the cables from the risk of mechanical damage (for example with sheaths, channels, or conduits).

Connect on each load cell a ground earth wire (minimum section equal 4 mm²), to the mounting accessories.

Do not weld on the mechanical structure after the positioning of the cells.

In the case of use with vibration or dynamic load protect the load cells with anti-vibrating mounts.

Protect the load cells from any dust accumulation with appropriate protection or by cleaning or periodic removal.

If the electrical connection of the load cells is made in an area classified for the presence of a potentially explosive atmosphere, this must be carried out with equipment and accessories in accordance with the ATEX directive 94/9/EC.

Products broken or damaged should not be repaired, if not taken care of by the manufacturer GICAM; any tampering with the load of the product will void the performance, safety and warranty.

Any spare part should be acquired, supplied and fitted by the manufacturer GICAM.

INSTALLATION SITE

The load cells are Group II equipment, or intended to be used in installations and surface industry.

The load cells must be used in accordance with norm EN 60079-10, EN 61241-10, EN 60079-14, EN 61241-14.

The installer and the user are solely responsible for the compliance to the characteristics of the place of installation to the limits and the characteristics referred to above. A guide to the Zone Category association of installation is represented by the following table (see Directive 99/92/EC, Annex IIB, "CRITERIA FOR THE SELECTION OF EQUIPMENT AND PROTECTIVE SYSTEMS" and Directive 94/9/EC, Annex I, "CRITERIA FOR THE CLASSIFICATION OF GROUPS OF EQUIPMENT IN CATEGORIES").

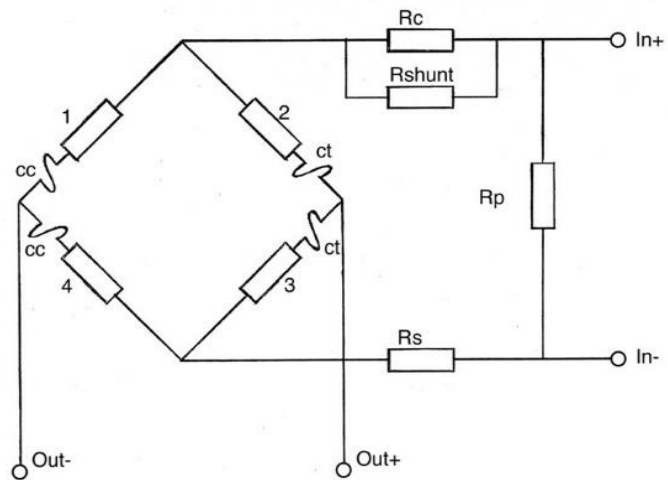
Category	Installation Zone
Gas, Vapor, mists	
1 G	Zone 0 or Zone 1 or Zone 2
2 G	Zone 1 or Zone 2
3 G	Zone 2
Dust	
1 D	Zone 20 or Zone 21 or Zone 22
2 D	Zone 21 or Zone 22
3 D	Zone 22

ELECTRICAL CONFIGURATION

The load cells are constituted by a Wheatstone Bridge, as shown in the following figure:

1, 2, 3, 4	STRAIN GAUGES
Rc	COMPENSATING RESISTANCE OF THE ELASTIC MODULUS
Rs	COMPENSATING RESISTANCE OF FULL SCALE
Rp	RESISTANCE OF BALANCING BRIDGE
Cc	ZERO COMPENSATION
Ct	ZERO COMPENSATION IN TEMPERATURE DRIFT

CONNECTIONS	
4	6
red.....In+	red.....In+
black.....In-	blue.....In-
white.....Out-	yellow.....Out
green.....Out+	green.....Out+
	white.....Sense+
	black.....Sense-



See the above table for colour coded wire connection.

CABLE PASSAGE

The cable gland on the load cell should not under any circumstances be removed, remain loose or replaced.

DOUBLE SHEAR BEAM / TENSION / COMPRESSION LOAD CELLS & LOAD PINS

INSTALLATION & PREPARATION OF PERSONNEL

The personnel that installs, maneuvers and manages the maintenance of these equipments or that work in places where there is a risk of explosion due to the presence of gas, vapors, mists or combustible dusts, must be qualified and trained with regards to the precautions and procedures to be implemented to reduce or eliminate the risk of explosions.

It is the responsibility of the user to observe the above in accordance with the requirements of the rules and legislations.

These instructions provide additional information necessary for the correct use of the product in places with risk of explosion.

SECURITY INSTRUCTIONS

The field of use of the load cells is the one described in this manual; performance of same are guaranteed only within the limits reported here.

The use of the product in a manner, which does not meet these requirements will void any liability of the manufacturer with regards to the performance of the product.

The damage of any part constituting the load cells can result in loss of ability to reduce the risk of ignition in a potentially explosive atmosphere.

The product at the time of sale, has a product tag on it for declaration of conformity as per the manual: This product tag must be stored and preserved at all times.

The installation, use and maintenance of the load cells are in part governed by the guidelines in this manual and in part contained in the rules applicable to installation and verification in places where there is danger of explosion EN 60079-14, EN 60079-17, EN 61241-14, EN 61241-17.

The electrical connection of the load cells must be implemented in accordance with EN 60079-14, EN 60079-25 and EN 61241-14 and performed with accessories, devices and methods adapted to the installation zone.

In case of use in potentially explosive atmospheres the load cells must be protected by suitable barrier intrinsically safe with appropriate parameters, which are respectively:

$U_i = 15V$ $I_i = 900mA$ $C_i = \text{negligible}$ $L_i = \text{negligible}$.

The parameters must be in combination to the data relating to the cable in use in accordance with the requirements set out in EN 60079-25.

The maximum input parameters listed above must be taken as maximum values to which it is possible to subject the assembly of the four connecting wires.

The maximum supply voltage is equal to 15Vcc.

Observe the direction of force application to the load cells, avoiding stresses and mechanical stresses that might compromise the integrity of the load cells and reducing to a minimum any mechanical constraints between the plane and the weighing structure, to avoid defects of weighing and return to zero.

Do not exceed the limits of the temperature reported in the Product Tag.

Do not remove the Product Tag from the load cells.

To adequately protect the cables from the risk of mechanical damage (for example with sheaths, channels, or conduits).

Connect on each load cell a ground wire (minimum section equal 4 mm²), to the mounting accessories.

Do not weld on the mechanical structure after the positioning of the cells.

In the case of vibration or dynamic load protect the load cell with anti-vibrating mounts.

Protect the load cells from any dust accumulation with appropriate protection or by cleaning or periodic removal.

If the electrical connection of the load cells is made in an area classified for the presence of a potentially explosive atmosphere, this must be carried out with equipment and accessories in accordance with the ATEX directive 94/9/EC.

Products broken or damaged should not be repaired, any tampering of the load cell will void the performance, safety and warranty.

Any spare part should be acquired, supplied and fitted by the manufacturer GICAM.

INSTALLATION SITE

The load cells are Group II equipment, or intended to be used in installations and surface industry.

The load cells must be used in accordance with norm EN 60079-10, EN 61241-10, EN 60079-14, EN 61241-14.

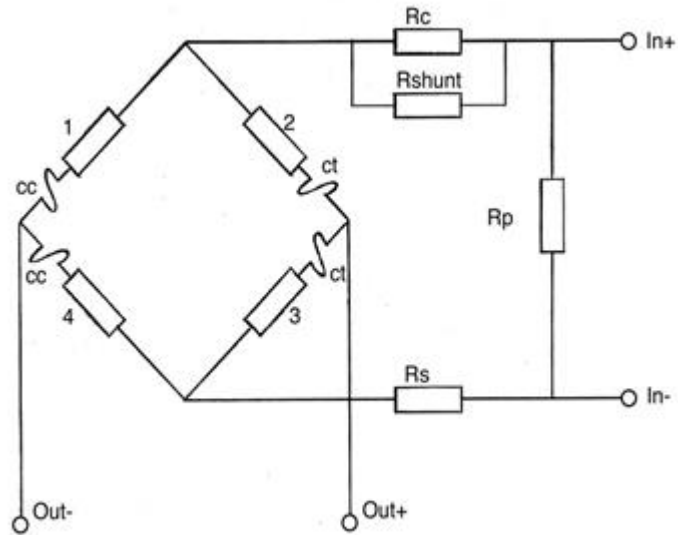
The installer and the user are solely responsible for the compliance to the characteristics of the place of installation to the limits and the characteristics referred to above. A guide to the Zone Category association of installation is represented by the following table (see Directive 99/92/EC, Annex IIB, "CRITERIA FOR THE SELECTION OF EQUIPMENT AND PROTECTIVE SYSTEMS" and Directive 94/9/EC, Annex I, "CRITERIA FOR THE CLASSIFICATION OF GROUPS OF EQUIPMENT IN CATEGORIES").

Category	Installation Zone
Gas, Vapor, Mist	
1 G	Zone 0 or Zone 1 or Zone 2
2 G	Zone 1 or Zone 2
3 G	Zone 2
Dust	
1 D	Zone 20 or Zone 21 or Zone 22
2 D	Zone 21 or Zone 22
3 D	Zone 22

ELECTRICAL CONFIGURATION

The load cells are constituted by a Wheatstone Bridge, as shown in the following figure:

1, 2, 3, 4	STRAIN GAUGE
R _c	COMPENSATING RESISTANCE OF THE ELASTIC MODULUS
R _s	COMPENSATING RESISTANCE OF FULL SCALE
R _p	RESISTANCE OF BALANCING BRIDGE
C _c	ZERO COMPENSATION
C _t	ZERO COMPENSATION IN TEMPERATURE DRIFT



CONNECTIONS	
4	6
red.....In+	red.....In+
black.....In-	blue.....In-
white.....Out-	yellow.....Out
green.....Out+	green.....Out+
	white.....Sense+
	black.....Sense-

See the above table for colour coded wire connection.

CABLE PASSAGE

The cable gland on the load cell should not under any circumstances be removed, remain loose or replaced.

JUNCTION BOX

INSTALLATION & PREPARATION OF PERSONNEL

The personnel that installs, maneuvers and manages the maintenance of these equipments or that work in places where there is a risk of explosion due to the presence of gas, vapors, mists or combustible dusts, must be qualified and trained with regards to the precautions and procedures to be implemented to reduce or eliminate the risk of explosions.

It is the responsibility of the user to observe the above in accordance with the requirements of the rules and legislations.

These instructions provide additional information necessary for the correct use of the product in places with risk of explosion.

SECURITY INSTRUCTIONS

The field of use of the instrument in areas at risk of explosion foresees a special attention and particular precautions in the usage and maintenance phase.

Check the ground connection after installation.

Avoid dust deposits.

Clean only with a damp cloth and/or antistatic products.

The instrument was approved for zones of use having specific characteristics: Do not install and use the tool in different environments than those mentioned.

The safety of the instrument depends on the degree of protection IP65. Do not tamper with or alter the seals of the instrument (cable channels, tightening screws for closing).

The safety of the instrument depends on the degree of protection IP65. Do not tamper with or alter or replace the typology of the resin.

Carry out maintenance work in accordance with standard EN 1127-1:1997.

Maintenance must be carried out after removing power supply to the equipment.

Prevent the accumulation of electrostatic charges.

Do not cover the instrument with roofs made of materials that can be electrostatically charged.

Paint or repaint only with anti-static paint.

Carry out wiring in accordance with standard EN 60079-14.

Do not remove the label placed on the box "Do not open under tension".

INSTALLATION SITE

The Junction box is Group II equipment, or intended to be used in installations and surface industry.

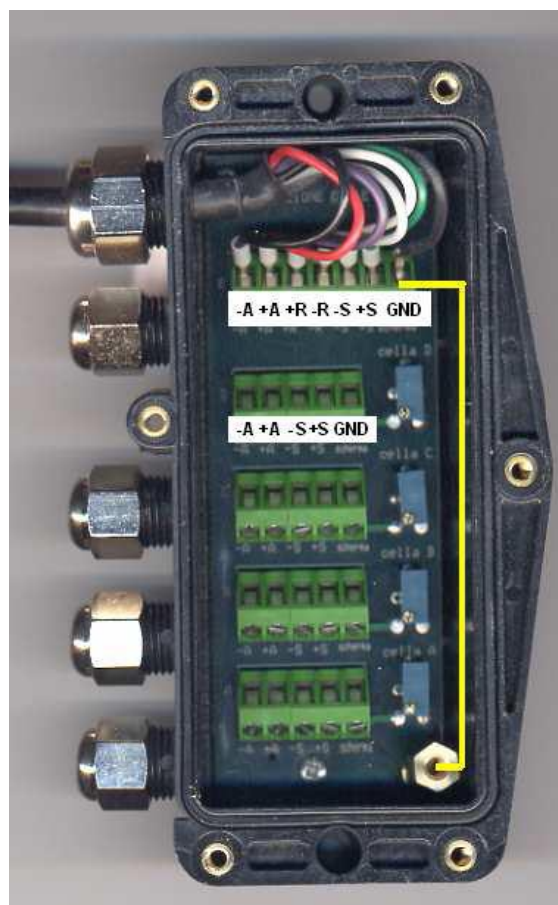
The load cells must be used in accordance with norm EN 60079-10, EN 61241-10, EN 60079-14, EN 60079-25, EN 61241-14.

The installer and the user are solely responsible for the compliance to the characteristics of the place of installation to the limits and the characteristics referred to above. A guide to the Zone Category association of installation is represented by the following table (see Directive 99/92/EC, Annex IIB, "CRITERIA FOR THE SELECTION OF EQUIPMENT AND PROTECTIVE SYSTEMS" and Directive 94/9/EC, Annex I, "CRITERIA FOR THE CLASSIFICATION OF GROUPS OF EQUIPMENT IN CATEGORIES").

Category	Installation Zone
Gas, Vapor, Mist	
1 G	Zone 0 or Zone 1 or Zone 2
2 G	Zone 1 or Zone 2
3 G	Zone 2
Dust	
1 D	Zone 20 or Zone 21 or Zone 22
2 D	Zone 21 or Zone 22
3 D	Zone 22

ELECTRICAL CONFIGURATION

SYMBOL	REFERENCE	COLOUR
A-	POWER SUPPLY-	BLACK
A+	POWER SUPPLY+	RED
R+	SENSE+	VIOLET
R-	SENSE-	GREY
S-	SEGNA-	WHITE
S+	SEGNA+	GREEN
GND	GND	SCREEN + GROUND



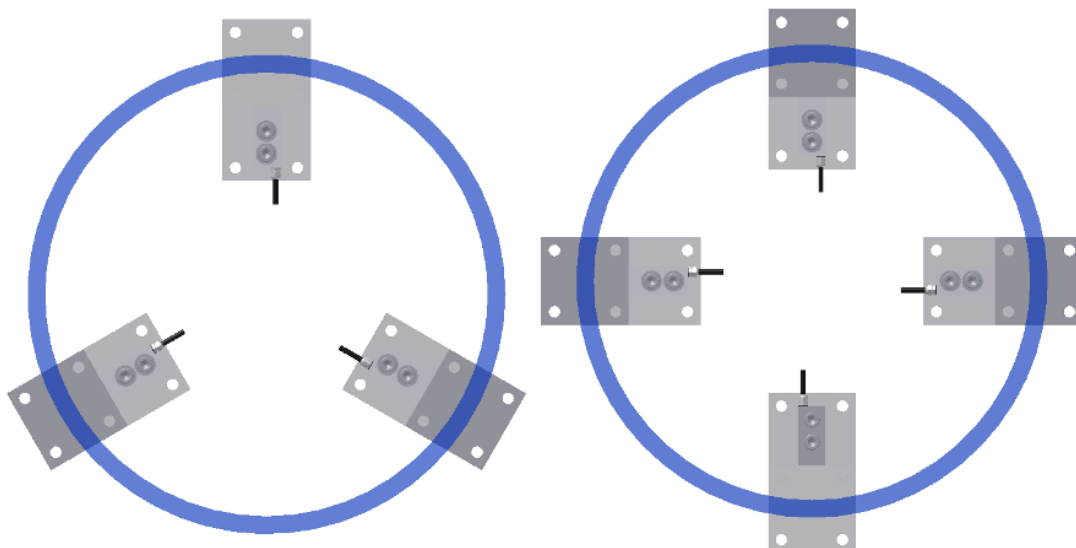
WEIGHING SYSTEMS FOR SILOS & TANKS

INSTALLATION

A typical weighing system for a tank consists of load cell that generates and feeds a signal, which is proportional to the weight of the tank and an electronic device that amplifies, interprets and displays the signal. The accuracy of a similar system depends on many factors:

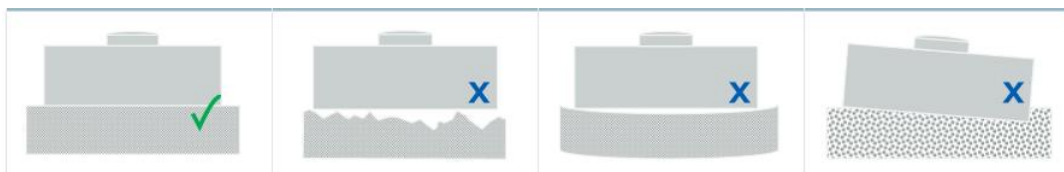
- Indicator, load cells and mounting accessories.
- Support structures.
- Piping and system for lateral support of the structure
- The surrounding environment (temperature, vibration, deformation, electrical disturbances).

For the choice of load cell it is important to check if the silo/reservoir is located in the vertical or horizontal position, if it rests on 3 or 4 points, if it is inside or outside of a building, if it contains liquid or solid products, if it rests on the ground or on a deck and finally the rigidity of the support structure.



SUPPORT PLANE

Before proceeding with the installation of the load cells, make sure that the floor of the structure on which it rests is levelled. Attach the mounting accessories of the load cell and check if its in a horizontal position. With the tank empty, power the weighing system, measure the output signal of each cell. The output signal should be proportional to the weight of the tank and to the number of load cells or mounts used. In case of differences between the signals over 15% insert shims between the point of application of the load on the cell and the reservoir, so that the signal at the output of each cell is as close as possible to the theoretical value.

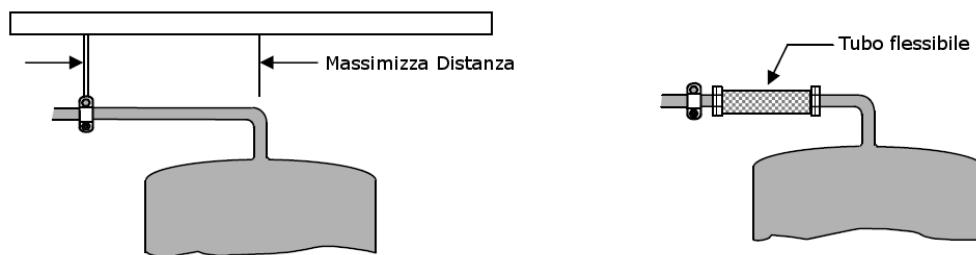


CONSTRAINTS

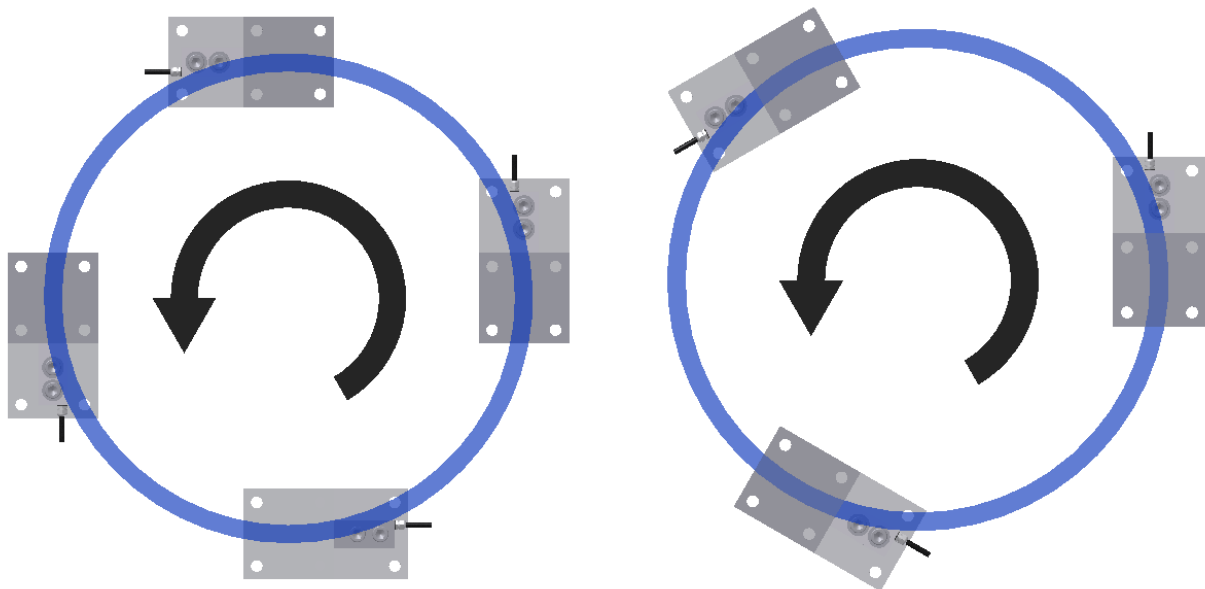
Often in a weighing system problems are identified when the system is running. The main causes of these problems are to be found in:

- Rigid pipes connected to the tank.
- Movements induced by stirrers
- Collapses in the supporting structure.

In case of rigid pipes always, use flexible joints. Where it is not possible to check the constraints of the tubes maintain distance as far as possible from the tank in such a way as to guarantee a greater elasticity of the mechanical structure. In cases in which the mechanical constraints interfere with the accuracy of the system, use a weighing instrument that performs the calibration in more points and with sample weights to linearize the response of the weighing system.



In cases in which the supporting structure of the tank is formed by beams, place the load cells in correspondence of the vertical column in order to minimize bending of the support and reinforce the beam at the point of application of the load. In processes where stirrers are involved, make sure they are arranged in such a way that the weight is not on a single load cell, but is distributed on all.

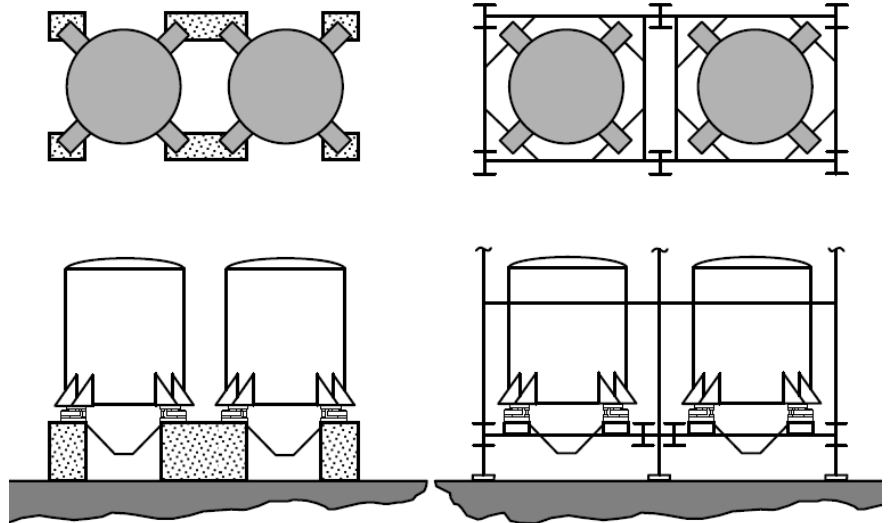


TEMPERATURE

A problem that is encountered in some plants is that of high operating temperatures or substantial variations. To reduce the conduction of heat from the tank to the load cells, place insulating plates (glass laminates with low thermal conductivity) between the bracket of the tank and the load cells. In the case where the tank undergoes expansion, use accessories, which allow the mechanical movement without losing accuracy.

POSITIONING OF LOAD CELL

It is always recommended to weigh tanks or mechanical structures using 3 supports at 120°, in order to obtain a balanced distribution of the load. However, when the mechanical structures already has 4 supports (90°), it is preferable to mount 4 load cells instead of modifying the geometry of the structure. After completion of installation connect and turn on the weighing system, upload and download more times with the same weight and check the value displayed is repetitive. Otherwise, there remains the possibility of mechanical friction.



OUTDOOR INSTALLATION

When a silo/tank is located outdoors, it is inevitably subjected to climatic phenomenas (action of wind, temperature variations high/low); we must therefore provide mechanical constraints against lateral displacements and systems of anti-vibration, where possible directly on the load cells with suitable accessories, or an additional mechanical structure. Use relevant types of load cells complete with their mounting accessories, additional anti-vibration mechanical structures and eliminate the horizontal constraints, with the result of having a simple mechanical system, and a better precision of the system while maintaining the safety against the action of external forces. It is advisable to protect the load cells against sun light.

ACCIDENTAL BREAKAGE

It is a good idea to use dummy load cells when the system is in the phase of construction in order to avoid breakage of the actual load cell due to electric welding or violent mechanical shock. If it is necessary to weld in the immediate vicinity of the cells, connect the earth terminal of the welding machine near the point where you must carry out the welding. Do not overload the weight, to prevent permanent deformation of the load cells. During the transportation of a weighing system, the load cells must be removed to prevent damage.

CABLE CONNECTIONS & JUNCTION BOX

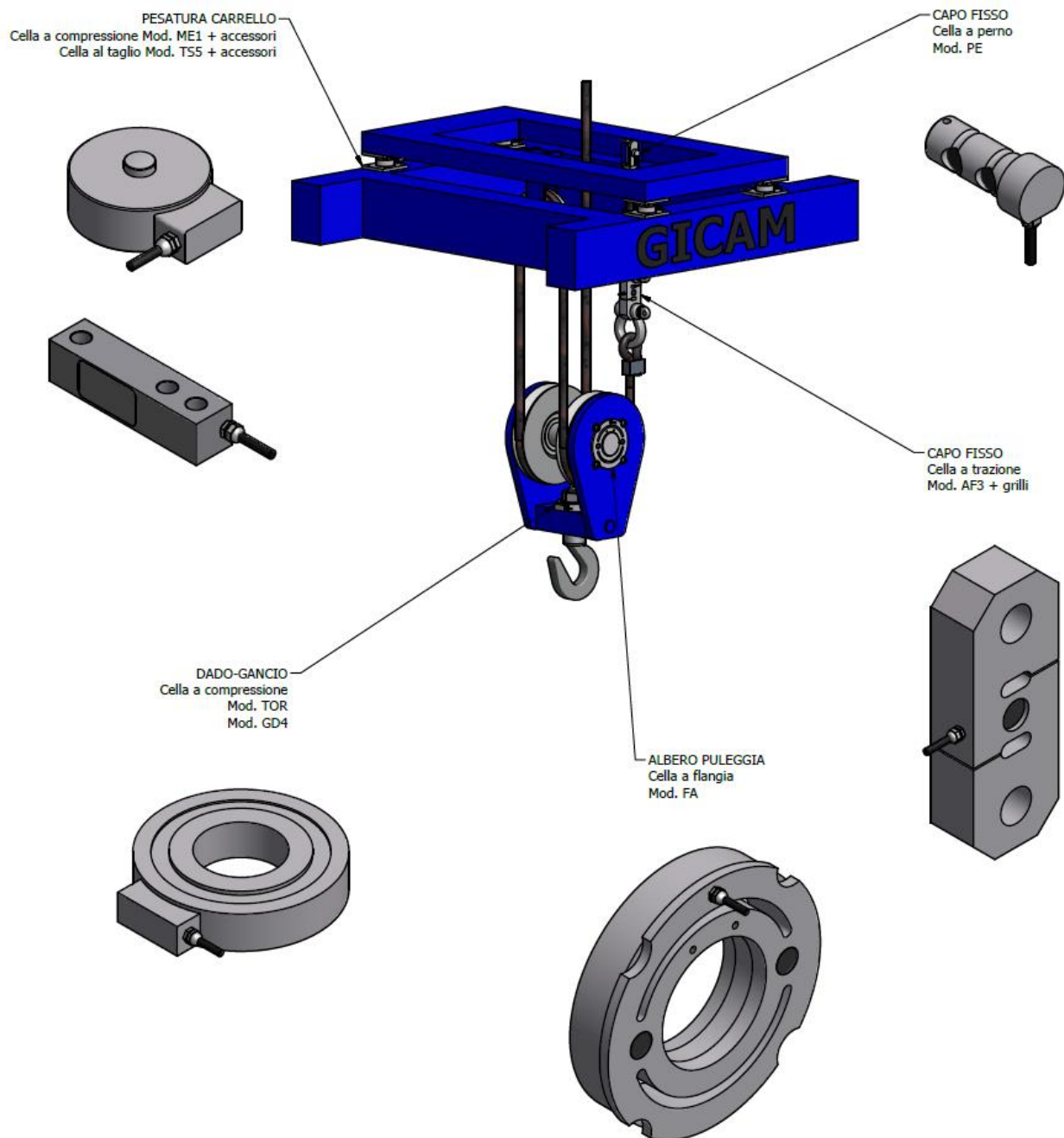
In weighing systems with numerous load cells, the load cells are connected in parallel through a watertight junction box. The connection is made by means of the terminals located inside the junction box or directly by welding cables together. The junction box provides 4 cable glands for the input of a corresponding number of load cells and a cable gland for exit of the cable that connects the load cells to electronic instrumentation. The latter is a special cable with 6 wire plus the screen with characteristics suitable for

transferring small signals (mV) at a great distance. Also available are the cables with blue sheath self-extinguishing and shielded.

Note: Do not insert the cables of the cells in the channels where there are power cables (because of disturbances).

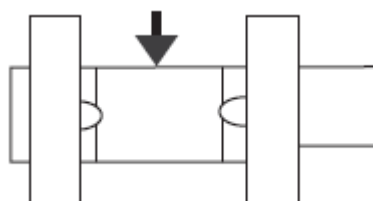
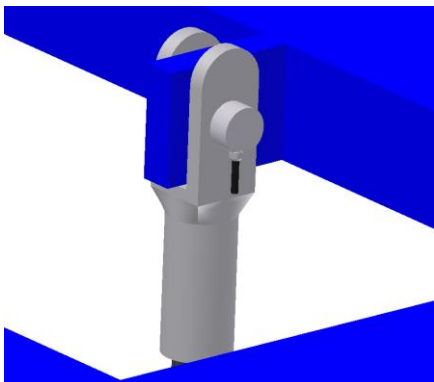
ALWAYS CONNECT THE SCREEN OF THE CABLE OF THE LOAD CELL ONLY AT THE POINT INDICATED ON THE INSTRUMENTATION FOR THE READING OF THE WEIGHT.

OVERHEAD CRANES



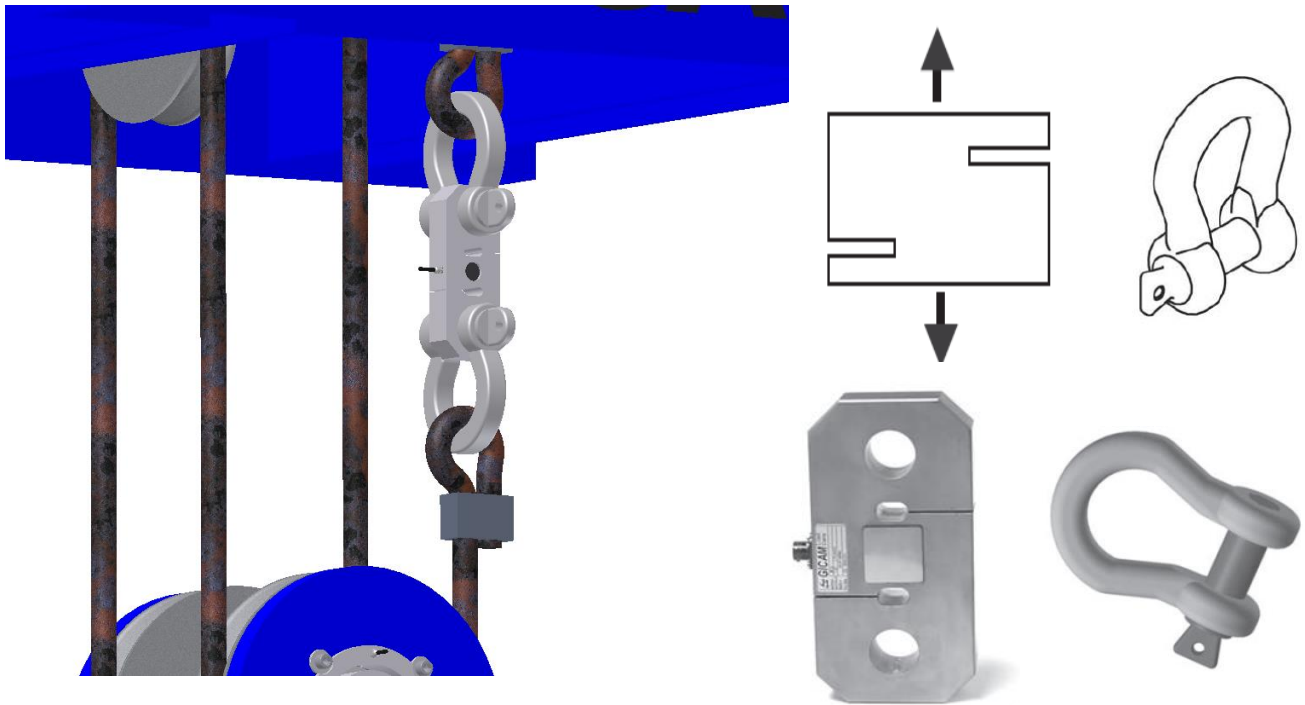
LOAD PIN

Load Pins for pulleys, hoists, crane, tanks and weighing systems, bridge cranes, etc.



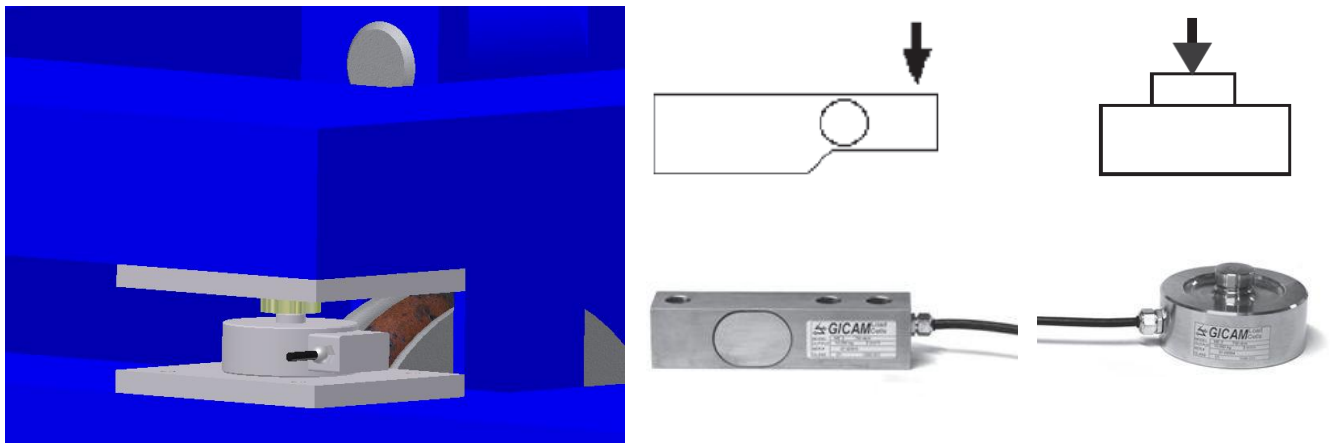
TENSION LOAD CELL

Compression load cells for weighing hoppers, force on transmission levers, scales, suspended weighing with tie rods and cables etc. Support and mounting with Shackles in stainless steel.



SHEAR BEAM / COMPRESSION LOAD CELLS & MOUNTING ACCESSORIES

Compression load cells for weighing platforms, silos, hoppers. Shear Beam load cells for weighing tanks, silos, hoppers, control loads on cranes, lifting systems winches, automation, etc.

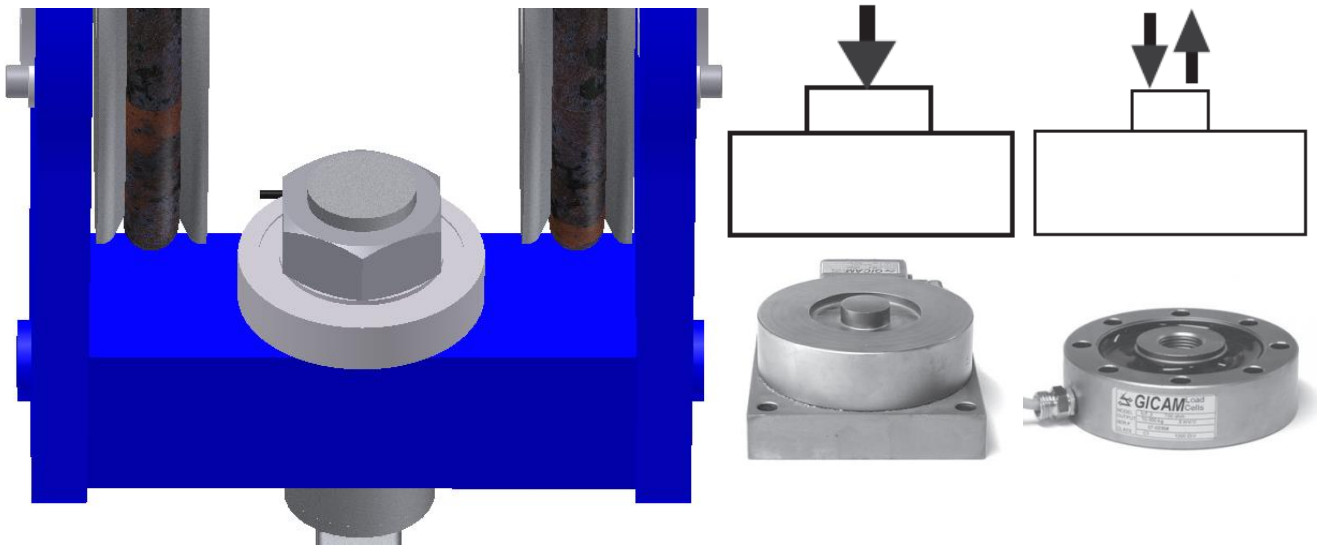


Mounting Accessories, allow the easy installation for compression, flexion and shear beam load cell, provide the ideal solution for concentration of the weight on the load cell.



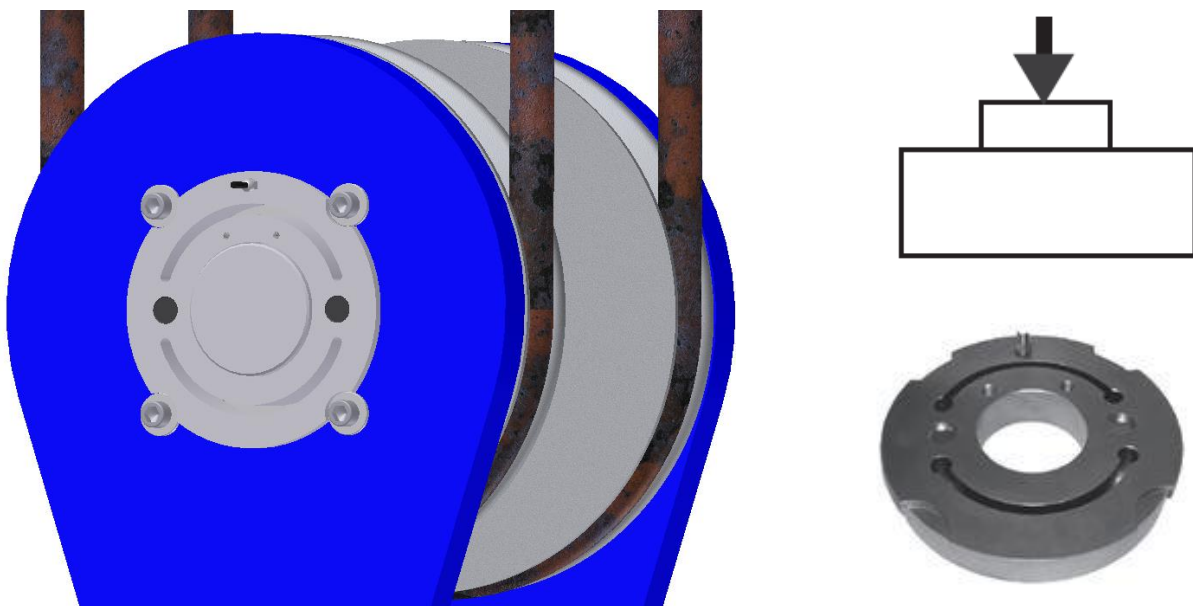
COMPRESSION / UNIVERSAL LOAD CELLS

Universal load cells for machines for weighing rocker, containers, automatic machines and compression load cells for weighing platforms, silos ,Hoppers, etc.

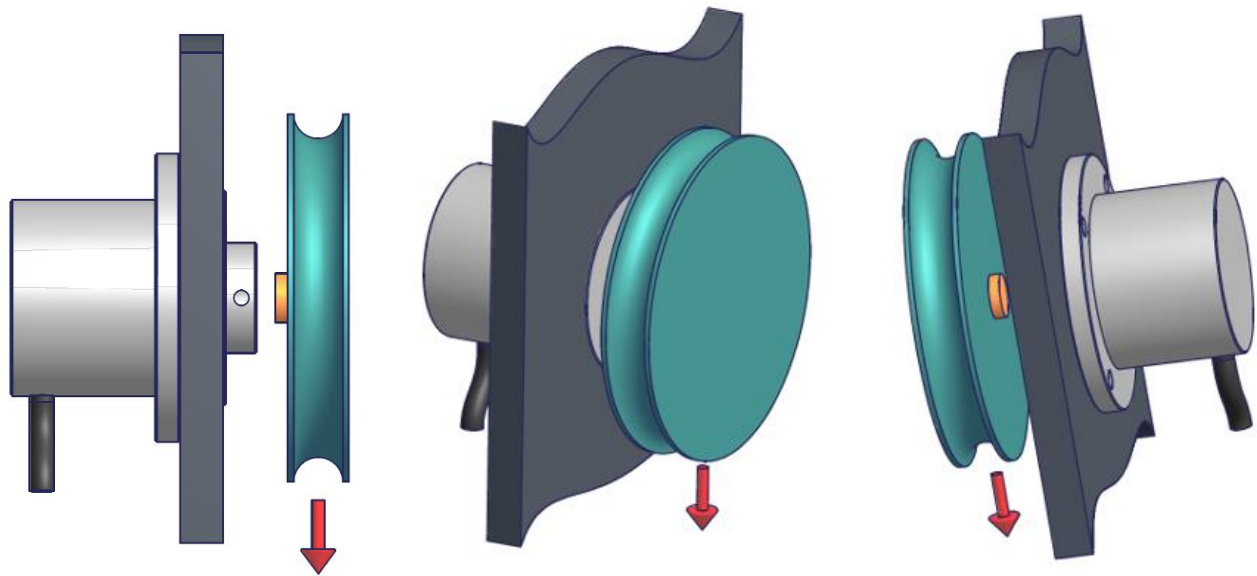


FLANGE LOAD CELL

Flange load cells to control the tension on textile, paper, plastic films, rubber, leather, etc.

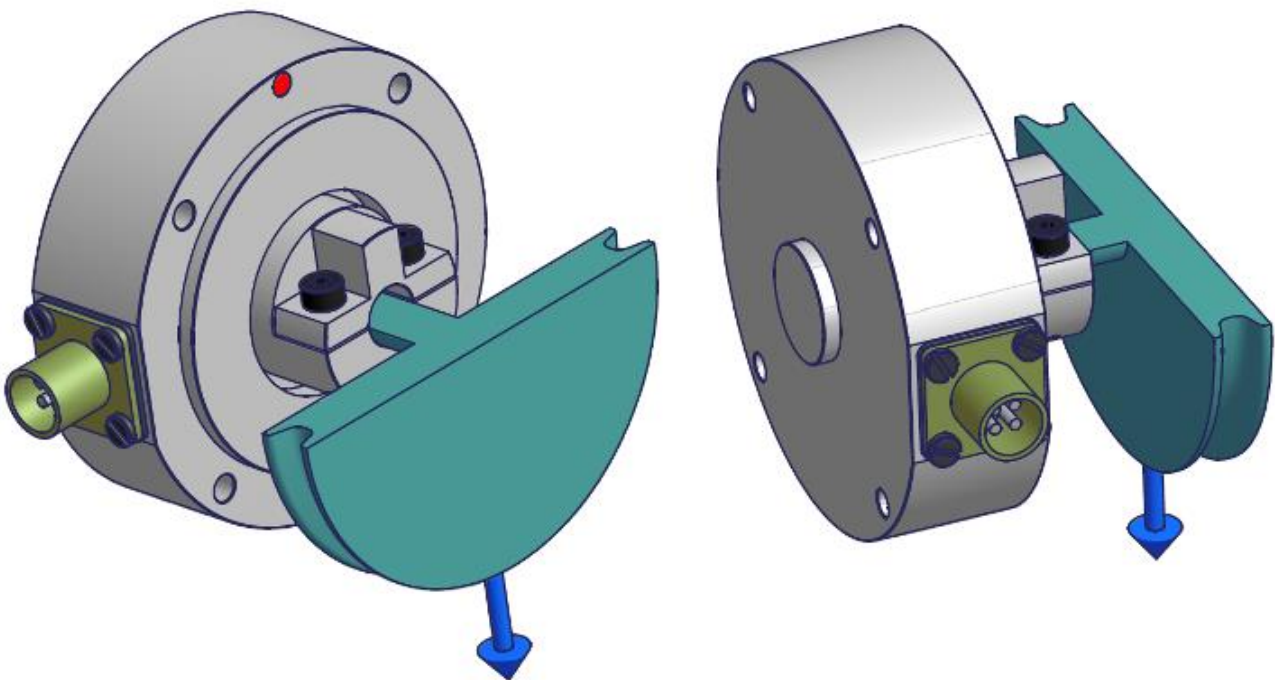


PULLEY LOAD CELL APPLICATIONS



GICAM PULLEY LOAD CELL

Model PS79-104



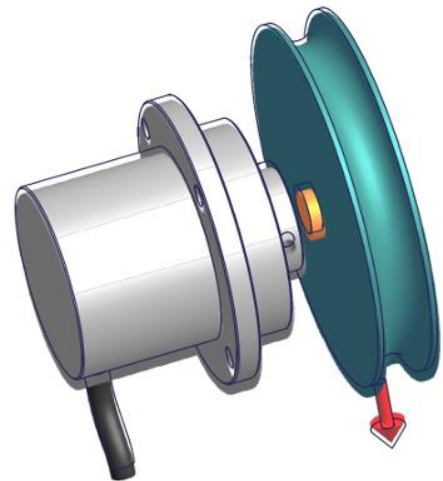
Features: compact, durable, excellent resolution. Easy to mount. Protection against overload.

Applications: Coil winding machines, unwinding machines, for any application that has to measure the tension on cables, tapes, optic fibres, textiles, etc.

Model P32

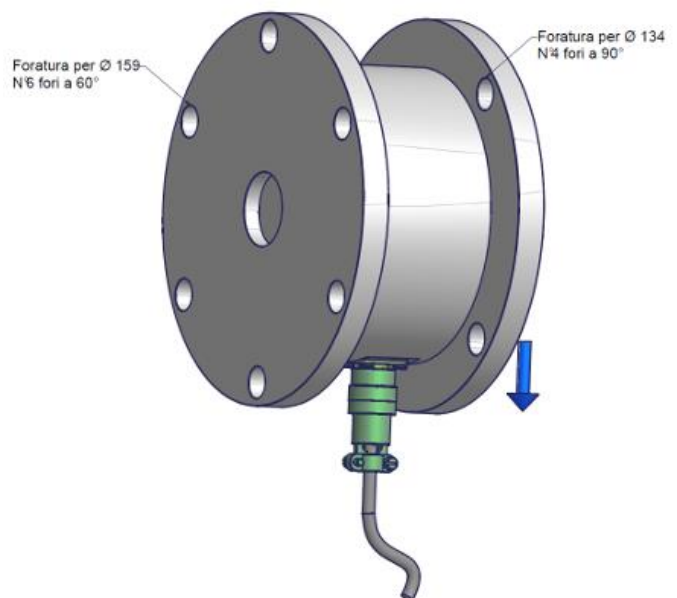
Features: compact, durable and excellent resolution. Easy to mount. High resonance frequency. Protection against overload.

Applications: coil winding machines, unwinding machines, for any application that has to measure the tension on cables, tapes, optic fibres, textile, etc.

**R-P134/159**

Features: compact, durable, excellent resolution. Easy to mount. Protection against overload.

Applications: to measure the tension on tapes, textiles, paper, nylon, metal laminates, rubber, leather, hides, wires, flexographic machines, etc.



WEB TENSION LOAD CELL APPLICATIONS

APPLICATION 1

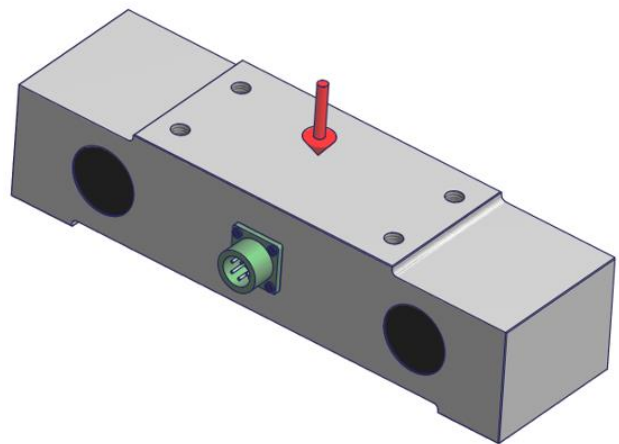


GICAM LOAD CELL

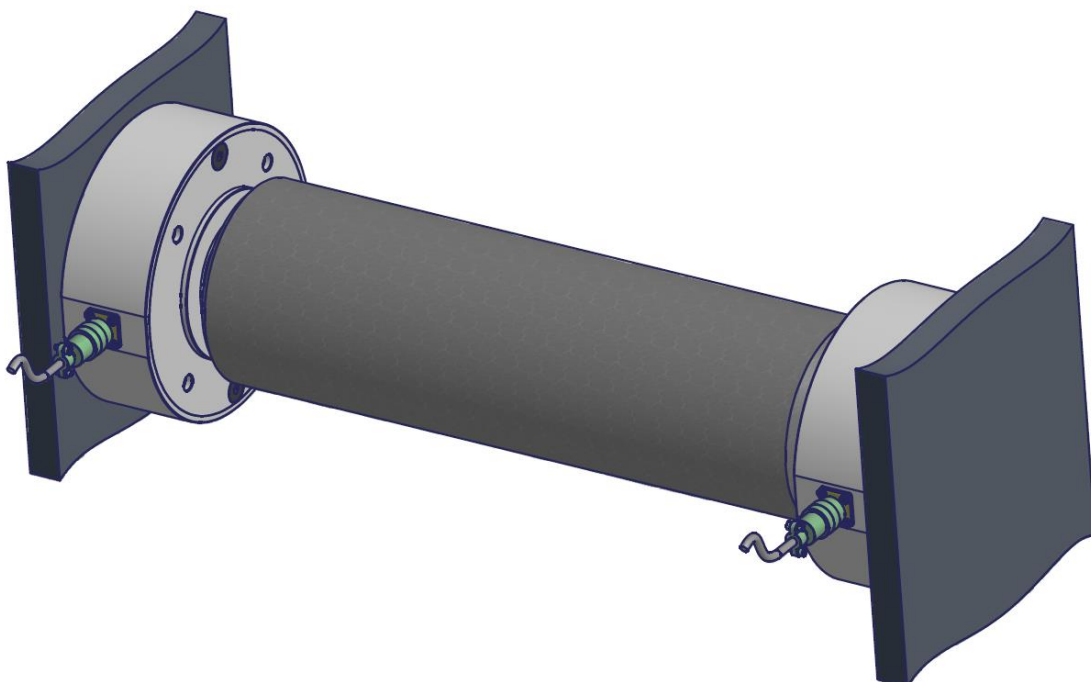
Model RT320

Features: load cell for pillow blocks. Not affected by forces on two axes excluding the one taking the measurement. Protection against overload.

Applications: to measure the tension of tapes, textiles, paper, nylon, rubber, metallic laminates, hides, flexographic printing, etc.



APPLICATION 2

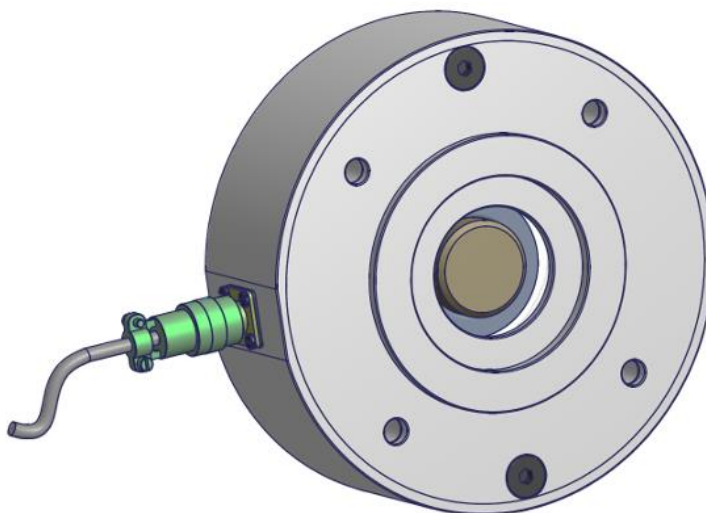


GICAM LOAD CELL

Model R105B/125B/175B

Features: guide hole for the locking pin at the end of the roller. Easy to mount on new or existing machines. Slim profile. Protection against overload.

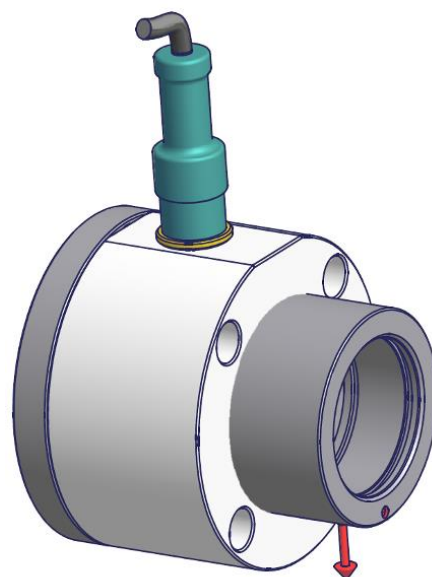
Applications: to measure the tension on tapes, textiles, paper, nylon, metallic laminates, hides, flexographic printing, photographic developing machines, etc.



Model R84

Features: possibility of greasing the bearings sideways. Easy to mount. Standard holes. Option 4-20mA internal amplifier. For ball bearings having diameter 32, 35, 40.

Applications: to measure the tension on tapes, textiles, paper, metallic laminates, plastic, flexographic printing, photographic developing machines, etc.



Model R80M

Features: possibility to rotate the load cell 360° to compensate misalignment. Easy to mount. Protection against overload.

Applications: to measure tension on tapes, textiles, paper, metallic laminates, plastic, flexographic printing, etc.

