1. INSTRUCTIONS: HOW TO INSTALL THE LOAD CELLS

1.1 STRUCTURAL SPECIFICATIONS

It is important to mount the load cells on a fairly rigid structure. Any movement or bending would result in an uncorrect alignment and/or zeroing of the system.

1.2 OBSERVING RULES

The cells must be mounted according to the instructions.

1.3 INSTALLING COMPRESSION CELLS

The load cells must be placed on flat horizontal surfaces.
The structure must be strong enough to maintain the horizontal surface.
Where possible place the structure on three rather than four cells as three guarantees better support.

1.4 INSTALLING TRACTION CELLS

Traction cells must be hung from a sufficiently strong structure and must be mounted so as to bear the weight on the vertical axis. Joints may be used in order to compensate defects of alignment in installation.
Defects in alignment can give rise to problems with the measuring and zeroing systems.

1.5 INSTALLING FLEXION CELLS

Flexion cells should be installed in the same way as the compression cells. An accessory is available which is easy to use and which makes installation much easier. It can absorb vibrations and knocks, etc.
This accessory allows the cell to be in a fixed position.
We recommend the use of suitable strong bolts.

1.6 REMOVAL OR REDUCTION OF MECHANICAL RESTRAINTS

It is most important that mechanical restraints (between the support structure and the weighed structure) are removed or reduced to a minimum in order to avoid problems with weighing and zeroing.
Since the risk of the cells buckling is reduced to a few millimetres, it is possible to obtain good results when weighing, providing that a few simple precautions are followed, even when tubes or joints are present between the two structures.
These precautions and other similar ones can reduce the risk of mechanical restraints and so allow the cells to supply a correct reading.
It would be useful to:
- use flexible tubes and elastic connections;
- use connections with wide openings and rubber protection;
- when using joints with rigid and welded tubes, place the end of the tube in a horizontal position and anchor it as near as possible to the supporting structure (at least 10 times the diameter of the tube).

1.7 REMOVAL OF LOCKS FOR TRANSPORT

Some cells are sold complete with accessories.
In these cases the accessories are locked on to the cells before transfer in order to avoid damage to the strain guage during transport due to knocks or vibrations.
These locks must be removed after installation to allow the cells to perform properly.

1.8 PRECAUTIONS WHEN CARRYING OUT WELDING

After having installed the cells it would not advisable to carry out electric welding on the surrounding metallic parts.
If this were unavoidable the welder and the structure must be earthed in order to avoid current passing through the cells which would result in definite damage to the strain guages.

1.9 EARTHING THE WEIGHING SYSTEM

The following instructions should be observed in order to obtain a correct equipotential connection of the weighing system¹s metal parts which are necessary for good working order:
- connect the structure to be weighed to a safe ground tap by means of a suitable copper conductor (minimum 16 mm2);
- staple the upper and lower plate of each single load cell;
- connect each of the other supporting plates to a common point;
- connect this earth to a safe ground tap.

With these by-pass connections the cells are protected from welding and static current which may be created by friction and which may lead to damage to the strain guage or the weighing system.

1.10 ENVIRONMENTAL CONDITIONS OF USAGE

1.10.1 THINGS TO AVOID

Dust can get between the cells and the mechanical structure and in time this crust can interfere with weighing.
In this case it would better to protect the cell with a cover to avoid the formation of dust.

1.10.2 ABSORBING SHOCK AND VIBRATIONS

Load cells can be damaged if they are submitted to knocks and vibrations.
It is advisable to place shock absorbers between the cell and the object to be weighed.

1.10.3 THERMAL EXPANSION

Precautions must be taken when the system is subjected to extreme temperatures which may result in thermal expansion.
The object to be weighed can be protected with teflon rings, rollers or ball bearings which allow it to slide freely and thus avoid coming into contact with the cell.

1.10.4 PROTECTION IN DAMP CONDITIONS

When the system is installed outdoors and subject to rain, fog, etc., or indoors but subject to cleaning with water or steam, etc., cells with IP 67 protection can be used but the following precautions should be observed.
- Coat the load cells with a thick layer of silicone grease; especially the space between load cell itself and the upper point of support.
- Protect the cells with metal or rubber screens to avoid direct contact with water.
- If the system is installed in an area where puddles are likely to form, the water should be pumped away.

1.10.5 WINDY CONDITIONS

If the system is subject to windy conditions outdoors, pay special attention to the position of the cells and the system¹s point of anchorage. Windforce must be taken into account to avoid overloading the system.

2. HOW TO INSTALL
WIRES AND JUNCTION BOXES

2.1 CONNECTING THE ELECTRONIC DEVICE

The connection of the cell¹s wire to the electronic device or to an intermediate junction box is standard and is based on the following colours:

CELL WIRE	ON THE ELECTRONIC DEVICE	
YELLOW wire	connect to	positive sign
GREEN wire	connect to	negative sign
RED wire	connect to	cell¹s positive power supply
BLUE or BLACK wire	connect to	cell¹s negative power supply.

2.2 CONNECTING MORE THAN ONE CELL

If more than one cell has to be connected to the same electronic device a junction box is normally situated near the cells.
The same coloured outgoing wires should be used as the wire leading to the cells (N.B.C. wire).
If no junction box is available, or if the electronic device is close to the cells, each wire can be taken to the electronic device and connected to the terminals on the cells.
It is important to connect wires of the same colour.

2.3 INSTALLING IN HEAVY-DUTY CONDITIONS

By observing the following precautions electrical problems can be avoided.
It is advisable to use water-tight casing to protect the cell¹s wires, and the connections. Connections inside the boxes should be welded or good quality clamps should be used. The cell¹s signal is low tension (mV) so bad conduction (bad contacts) and even slight dampness can cause problems and affect the measurement.

2.4 PROTECTION FROM ELECTROMAGNETIC PROBLEMS

By observing the following precautions electromagnetic problems to the measuring system can be avoided.
- The wires to the cells and if necessary, extension wires, either in or from the panels, must be covered and placed as far as possible from other cables.
- The wire leading to the panel must have a single entry.
- The wires after entering the panel must be connected directly to the electronic device without the use of clamps.

2.5 INSTALLING A FERRITE NUCLEUS ON THE LOAD CELL¹S WIRE

A ferromagnetic nucleus can be installed to the load cell¹s wire near the electronic device which will eliminate problems.
The ferromagnetic nucleus supplied by N.B.C. is two part ferrite contained in two plastic shells.
The nucleus must be placed on the wire at least 20 or 30 cms. from the electronic device. The wire must be free of protection and must be earthed.
To install the nucleus it is sufficient to close the shells around the wire. If the diameter is sufficient it is advisable to pass the wire twice through the ferrite nucleus to obtain the maximum benefit.

3. HOW TO INSTALL
THE INSTRUMENT PANEL

3.1 PROTECTION FROM ELECTROMAGNETIC PROBLEMS

The following instructions can help to avoid electromagnetic problems to the electronic device in the panel.
- The power supply must come from a special line or at least from a line which is not overloaded with other appliances (for example electric ovens, large motors or other machinery which consume a large amount of electricity).
- If the electronic device is installed in a panel with a large number of electromagnetic switches and electric valves it is advisable to apply RC filters to the coils. Connect the instrument to the earth with a suitable clamp.
- If the electronic device is installed in a panel with transformers, electromagnetic switches or inverters it is advisable to place the electronic device some distance from them or to place a shield in order to isolate them.
- If condensation should appear inside the electronic device it would be advisable to keep it switched on.

4. HOW TO TRANSPORT
READY MOUNTED EQUIPMENT

Whenever cells which have already been mounted need to be transported it is important that the following instructions are complied with in order to prevent damage to the strain guages.
- If possible dismantle the cells.
- If this is not possible mechanical locks between the two surfaces must be mounted so that the strain guages do not get damaged during transport.
- When an installation has to be repeatedly and easily moved it is advisable to use a locking system.