



Industrial Weighing Systems

9 Richmond St. Picton, ON Canada K0K 2T0

Ph: 613-786-0016 Cell: 613-921-0397 Fax: 613-476-5293

E-mail info@iwsystems.ca Website: www.iwsystems.ca

Cable runs from summing box to Instrument

Most load cells have 4 wire connections (+/- Excitation, +/- signal) and terminate in a local summing box. An interface cable is then run from the summing box to the instrument location with either 4 or 6 wires.

4-Wire Interface Cable runs **do not** sense the excitation at the summing box location.

Your display can drift due to cable resistance changes such as daytime temperature swings.

4-Wire runs are not recommended unless the distance from summing box to instrument is very short.

6-Wire Interface Cable should be used between the instrument and summing box.

The two added wires are sense lines that allow the instrument to measure the excitation directly at the summing card compensating for any voltage drop in the run. Since both Excitation and Signal are measured at the summing box the Mv/V specifications of the load cells are maintained for the load cell outputs.

Understanding load cell outputs.

Load cells are specified in Mv/V normally 1, 2 or 3 at full cell capacity.

Let's look at a 2 Mv/V cell loaded to its full capacity of 20,000 Lbs.

At an excitation of 10 VDC the output signal will be $(2 \text{ Mv/V} \times 10 \text{ VDC}) = 20 \text{ Mv}$.

If the excitation changes up or down so will the output signal for the fixed 20,000 Lb weight applied.

If the voltage dropped to 5 VDC with the same load the signal would be 10 MV, at 15 VDC the output would be 30Mv.

It is important to keep the excitation at the summing box constant or measured which is why we use SENSE wires.

Cable specifications:

A 100% overall shield is recommended between the summing box and instrument since we are dealing with low DC signals. Twisted pairs for Excitation, Sense and Signal will help with common mode rejection.

Minimum 22-20 gauge is suggested for distances up to 250 feet, 18 gauge up to 500 feet.

The wire gauge will affect voltage drops on long runs; contact us for cable runs up to 1000 feet.

Cutting or extending Load Cell Cable

Load cells are calibrated with a fixed cable length to set the Mv/V rating.

The Mv/V will change if this cable is cut or extended without sensing compensation.

Manufacturers tell you not to cut the supplied cable but they are seldom in the field trying to shove 30 extra feet of cable into a compact summing box.

To cut or not to cut may be determined by the accuracy expectations of the system.

Mechanical influences on your scale will exceed any error associated with changing cable lengths.

For scales where each cell is adjusted on the sum card such as a floor scale, cables can be cut as any changes in load cell outputs are adjusted with the individual load cell potentiometers.

For optimum accuracy cut the same length of cable from each load cell so all are affected equally.

This may not be practical as the distance to the summing box varies.

For reference load cell outputs change 0.0004 MV/V for each meter of cable cut or added.

Example:

A 1000 Lb cell with 20 feet of cable is cut to 15 feet, resulting in an output change of 0.2 lbs at Capacity

A 50,000 Lb cell with 50 feet of cable cut to 35 feet, resulting in an output change of 30.5 lbs at capacity.

In the larger capacity the cell may need to be adjusted at the summing card depending on the application.

For a truck scale the error would exceed the allowable tolerance but not on a storage silo.