



## High Speed Performance with Wash Down Capability

**THE MODEL 240 LOAD CELL** is one of the most accurate high speed load cells in the world. An understanding of its operation will assist with trouble free operation.

### PRINCIPLES OF OPERATION

An un-damped cantilever load cell can behave like a very stiff spring. Consequently when pre-loaded with a weight and shock excited by another weight the unit 'rings' for an appreciable time. A settling time of several seconds may be acceptable in platform scale applications, but it is not acceptable for high speed repetitive weighing. (fig. 1)

Tare weight increases settling time and therefore should be kept to a minimum.

With the model 240 damped load cell the settling time is drastically reduced from more than 1 second to less than 100 milliseconds. (fig. 2 & 3)

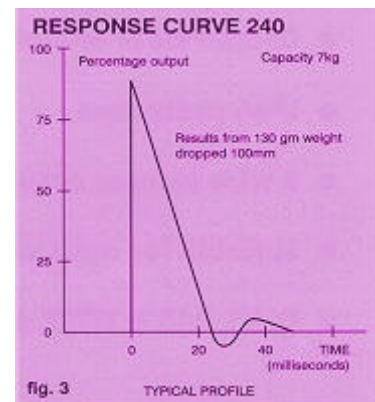
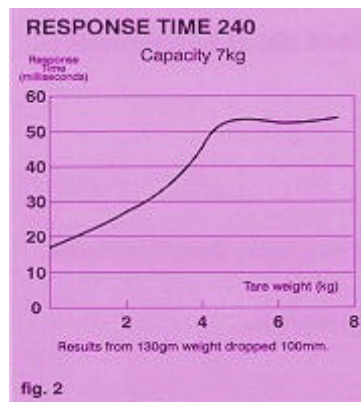
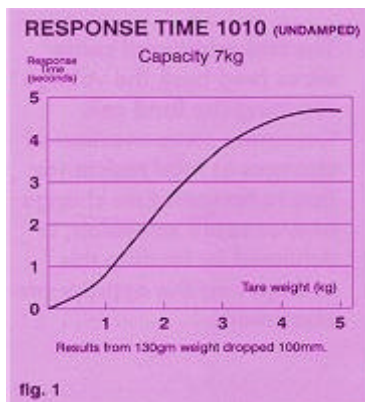
### MOUNTING

The precision obtainable from the model 240 can only be realized by careful attention to the mechanical mounting of the unit. It will be appreciated that if the full scale deflection of the load cell is < 0.4 mm and

the scale is divided into 4000 divisions, one division on the scale is the result of < 0.0001 mm. So any force, from whatever source, which brings about such a deflection will introduce an error into the system. It is for this reason that the base plate is solid and has a machined surface for mounting. Ensure therefore that the mounting support is correspondingly flat and rigid. Holding down bolts must have equal torque to 35-40 Nm 25-30 lbft). Also it is important that the load cell be level and that the level should not change significantly when the system is loaded. The initial level should be within 1 degree of the horizontal (check with a spirit level) and the deflection under load should not exceed 0.1 degrees.

### VIBRATION

The model 240, although being a damped load cell is not impervious to external vibrations. It is designed to damp its own natural tendency to vibrate when a load is applied reasonably quickly. This does not however mean that it rejects vibrations applied to it through its mountings. It is therefore essential to minimize such vibration, to ensure accurate readings. This can be achieved by mounting the load cell on a separate frame isolated from the heavier rotating parts of the machine, or by introducing anti-vibration or shock absorbers between the load cell and the mounting frame.



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### APPLYING THE LOAD

The load must be applied via the bearing surface which is uppermost on the load applicator. Both holes must be used, evenly torqued to 16Nm (12 lbft) so that the load is evenly distributed.

It is usual to use a flat bar or some other load spreading member between the applicator and the weigh platform, table or live superstructure. The mating section and the substructure, must be rigid, otherwise the latter will oscillate and superimpose on the load cell output, depending on the frequency and amplitude generated. The supporting member must be flat.

The load should be transported on to the weigh platform in such a way that it creates the minimum disturbance. If the load transverses across the platform, it should, if possible, avoid knocking the platform edge (i.e. no step). If the load is lowered on to the platform it should be a controlled placement, not a dropped load. For optimum performance the line of action of the applied load should act as near as possible to create line of the load cell - in both horizontal planes to minimize eccentricity effects.

### EFFECT OF TEMPERATURE

The preceding response curves reflect a typical ambient temperature of 20°C. Variations in temperature will affect the viscosity of the damping fluid and consequently the settling time of the load cell.

### INSTRUMENTATION

The load cell is essentially a strain gauge device of Wheatstone Bridge configuration having input/output signals in milli-volts. Normally, standard load cell weighing equipment instruments will match satisfactorily, but note that the load cell output is offset dependant upon platform or container weight. The cable should be clamped in position and should not be continuously flexing.

**Note**, the model 240 is supplied in six wire configuration and where possible this should be fully utilized.

### UNSTABLE READINGS

Unstable readings from this type of load cell can be caused by any of the following:

- 1) Mechanical interference between the loading mechanism and the frame of the machine. In particular where product builds up or dirt is trapped between the load pillar and the model 240 body.
- 2) The transportation grub screw in the load cap has not been opened or has vibrated back down into the closed position.
- 3) The sintered bronze breather filters located on the sides of the load cap are blocked with contamination such as dust. Or in a low temperatures application where the filters have been blocked by ice. If the application is in a corrosive atmosphere or the machine is washed down with aggressive chemicals, the filters can also corrode and become blocked. Plastic filters can be fitted for use in aggressive environments or a special version of the model 240 with remote breathing be supplied on request for use in high humidity, low temperature or dusty environments.

### SEALING

The model 240 is ideal for wash down conditions in the food industry and other demanding environments.

A dual combination of a wash down shroud and diaphragm is designed to prevent the ingress of water allowing the load cell to 'breathe', in order to overcome variations in barometric pressure.

Protection is designed to pass a 50 day humidity cycle at 95% R.H. and the unit is sealed to IP66. (BS 5490 IEC 529) Cert No. 2039.

### PACKAGING, TRANSPORT AND STORAGE

The load cell is packed in a cardboard housing for dispatch and should be stored in its original packaging if possible. It is essential to store the load cell upright with the transportation screw tight (see installation sheet). Storage temperatures should not exceed -15°C to +45°C. Never carry the model 240 by the cable.

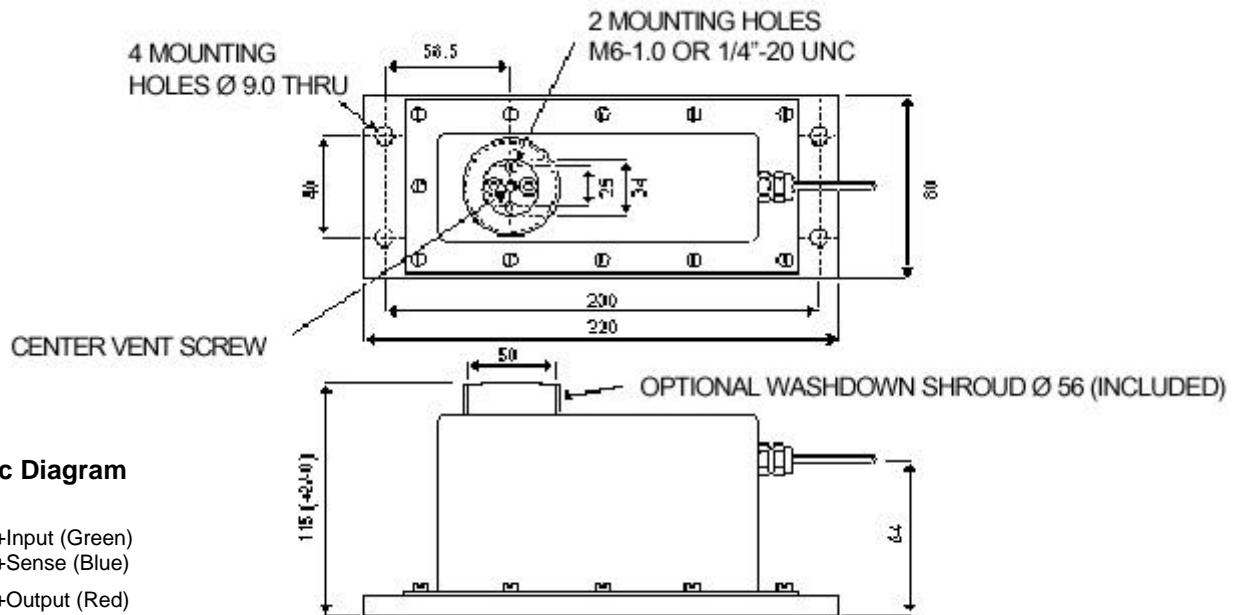
# Model 240

# Damped Load Cells

GRADE	HSW		C3**	UNITS
Rated Capacities	2, 3, 5	7, 10, 15, 20, 30, 50	5, 7, 10, 20, 30, 50	kg
Rated Output	2.0 ± 10%			mV/V
Total Error*	0.050	0.025	0.020	±% of Applied Load
Zero Return after 30 mins	0.075	0.050	0.015	±% of Applied Load
Temperature Effect: On Output	N/A	N/A	0.0010	±% of Applied Load / °C
Temperature Effect: On Zero	N/A	N/A	0.0026	±% of Rated Load Output / °C
Eccentric Loading	N/A	N/A	0.015	±% of Rated Output
Zero Balance	5.0			% of Rated Output
Temperature Range: Operating	-30 to +70			°C
Temperature Range: Compensated	-10 to +40			°C
Safe Overload	150			% of Rated Capacity
Ultimate Overload	300			% of Rated Capacity
Excitation: Recommended	10			Volts AC or DC
Excitation: Maximum	15			Volts AC or DC
Input Impedance	415 ± 15			Ohms
Output Impedance	350 ± 3			Ohms
Insulation Impedance	>1000			Mega Ohms
Deflection at Rated Capacity	<0.4			mm
Weight	3.7			kg
Construction	Coated Steel or Stainless Steel			
Environmental Protection	IP66			
Cable	5 Meters (Standard), 6 Wire, Polyurethane Jacket, Dual Floating Screen			
Approvals	OIML R60, NTEP			

\* Total Error - According to OIML R60 \*\*Standard 60% utilization - Lower utilization factors available on request.

## Outline Dimensions All Capacities (in mm)



## Wiring Schematic Diagram

