



# WEIGHBRIDGES



Digital Loadcell Weighbridge

# The perfect balance of

# Digital Loadcell Weighbridge

**Sansui Electronics Pvt. Ltd.** is an organization synonymous with a comprehensive range of electronic weighing systems & truck scales.

A company with a **dedicated R&D team**, has developed a micro controller based terminal that ensures high accuracy, excellent digital cornering & digital calibration with latest optional features like USB pen-drive backup, mobile SMS features, **online mailing of weighbridge weightment data to any email** etc. and a user friendly, high-tech truck weighing systems.

Sansui has specially engineered Electronic weighbridges that are equipped to give detailed print reports and are also compatible with PCs. The micro-controller based advanced weighbridges are armed with high-tech Double Ended Shearbeam type of loadcells. The high precision loadcells, aided by sophisticated electronics and strong **rugged platforms made from special steel section call parallel flange beams instead of the conventional 'I' girders or ISMB or tapered flange beam, incorporating very high strength** and rigidity for the lesser weight of the steel per running meter as compared to equivalent ISMB section. Thus ensuring a consistent performance of weighbridges for years.

Sansui weighbridge abide by the Standards of the Weights and Measures Department and have set international standards in truck weighing.

Today Sansui has a complete range of electronic weighing, something as light as 0.01mg to something as heavy as 120 Tonnes.

Sansui is the only company in India having extensive Sales & Service network, spanning all over the country having a high profile qualified and a well trained force of **more than 100 Service & Customer Support Engineers**, providing prompt after-sales service support to all the esteemed customers at their doorsteps. We are the only company to have our **own Fabrication workshop spread over an area of 110,000 Sq. Ft.**

## Pioneers in in-house cornering & Calibration

Sansui is the first company in India to achieve **in-house inside the factory itself, digital loadcell cornering and digital calibration at full load capacity** of a loadcell with the help of highly sophisticated machine, avoiding manual labour required to lift and place the weights physically at each corner of the platform for cornering and calibration. Thus **saving lot of hidden cost** that a customer would bear, specially in the coming years when all the Weights and Measures Dept., would be equipped with a special truck for verification, stamping and sealing of the weighbridge after checking its calibration and cornering.

Therefore, Sansui Weighbridge can be **installed within a day** of installation of the platform, consequently saving the time and hidden cost & money of the customer.



Loadcell Testing Result

## Testing /

Commissioned Units 1  
 Manufacturer SENSOMATIC  
 Testing rules Loadcell testing specification

Force (kg)	Loading (mV/V)						Net Output Average
	1		2		3		
	Preview Output	Net Output	Preview Output	Net Output	Preview Output	Net Output	
0.0	-0.00981	0.00000	-0.00986	0.00000	-0.00988	0.00000	0.00000
2000.0	0.19086	0.20067	0.19081	0.20067	0.19077	0.20065	0.20066
4000.0	0.39098	0.40079	0.39097	0.40083	0.39093	0.40081	0.40081
6000.0	0.59125	0.60106	0.59127	0.60113	0.59122	0.60110	0.60110
8000.0	0.79141	0.80122	0.79145	0.80131	0.79142	0.80130	0.80128
10000.0	0.99174	1.00155	0.99180	1.00166	0.99176	1.00164	1.00162
12000.0	1.19215	1.20196	1.19222	1.20208	1.19217	1.20205	1.20203
14000.0	1.39262	1.40243	1.39267	1.40253	1.39264	1.40252	1.40249
16000.0	1.59285	1.60266	1.59293	1.60279	1.59290	1.60278	1.60274
18000.0	1.79324	1.80305	1.79332	1.80318	1.79328	1.80316	1.80313
20000.0	1.99374	2.00355	1.99382	2.00368	1.99379	2.00367	2.00363
Zero Value	-0.00981 mV/V (Z= -0.490 %FS) Sensitivity 2.00363						
Memo	Report Number: 11						

Pre-loading frequency 100 Pre-loading force 20000.0 kg. Refran  
 Preheating time (h) \_\_\_\_\_ Loadcell Excitation 10 Testing  
 Tested by \_\_\_\_\_ Checked

## Digital Loadcells (DESB - Digital)

The double ended shear-beam type & ball type loadcells are specially designed for weighbridge applications, are the best of their kind available in the market. Unlike other loadcells these loadcells can weigh vertical as well as horizontal load components. Due to the unilink floating assembly, these can weigh/measure vertical loading component with a bear minimum off-center loading error which is very troublesome in other loadcells designs. The unilink floating assembly allows controlled floating of the platform whereas the ball type arrangement for the loadcell, allows free horizontal movement of the platform.



Moisture



Lightning & Surges



Dust & Dirt



## Features of Digital Loadcell

- In-built Hybrid Processor with Digital Output Signal (RS485)
- Factory calibrated with in-built 10 point linearization upto full capacity with loading in ascending as well as descending load on the loadcell. Thus eliminating the hysteresis error. All this calibration and compensation errors are stored inside the loadcell PCB. Also the change in calibration due to temperature changes, these temperature calibration coefficients are stored and thus each loadcell are very finely temperature compensated over and above the regular analog temperature compensation with Mod gauges. All this data of calibration, temp. compensation, hysteresis, linearity etc. of individual loadcell is stored inside the loadcell PCB. Once this is interfaced with the digital Indicator a copy of this data inside each loadcell can be stored inside the indicator.
- Multi Level Lightning Protection Circuit (First in the world to offer this feature)
- Designed to qualify to meet OIML R60- C3 standards
- Totally Tropicalised to suit harshest Indian Environment with robust IP-68 Design / Hermetically sealed
- Self Aligning
- Stored Calibration Data in Transducer as well as intelligent terminal.
- High speed upto analog to digital conversion 500 Readings/Sec. & baud rates upto 115,000
- Extreme Noise Immunity 5 x heavy industrial noise level +/- 15KV Electrostatic discharge protected.
- Very high stability (Capable of 6000 Divisions OIML)
- Programmable dynamic filter
- Wide operating voltage (5.4V – 18V)

## Data Input of Digital Loadcell

Product code Digital Loadcell Product Model DESB-20t (Digital)

Product status Post temperature compensation

The theoretical value	Linearity $\Delta \theta L$	Repeat-ability $\Delta \theta R$	Unloading (mV/V)						Average	Hysteresis $\Delta \theta H$
			1		2		3			
			Preview Output	Net Output	Preview Output	Net Output	Preview Output	Net Output		
0.00000	0.00000	0.00000	-0.00986	-0.00005	-0.00988	-0.00002	-0.00988	0.00000	-0.00002	0.00002
0.20036	0.00030	0.00002	0.19075	0.20056	0.19073	0.20059	0.19072	0.20060	0.20058	0.00008
0.40073	0.00008	0.00004	0.39084	0.40065	0.39084	0.40070	0.39082	0.40070	0.40068	0.00013
0.60109	0.00001	0.00007	0.59107	0.60088	0.59108	0.60094	0.59105	0.60093	0.60092	0.00018
0.80145	0.00018	0.00009	0.79119	0.80100	0.79123	0.80109	0.79119	0.80107	0.80105	0.00022
1.00182	0.00020	0.00011	0.99148	1.00129	0.99155	1.00141	0.99150	1.00138	1.00136	0.00026
1.20218	0.00015	0.00012	1.19187	1.20168	1.19193	1.20179	1.19189	1.20177	1.20175	0.00028
1.40254	0.00005	0.00010	1.39234	1.40215	1.39235	1.40221	1.39237	1.40225	1.40220	0.00029
1.60291	0.00016	0.00013	1.59264	1.60245	1.59273	1.60259	1.59264	1.60252	1.60252	0.00022
1.80327	0.00014	0.00013	1.79316	1.80297	1.79326	1.80312	1.79322	1.80310	1.80306	0.00007
2.00363	0.00000	0.00013	1.99374	2.00355	1.99382	2.00368	1.99379	2.00367	2.00363	0.00000
mV/V Linearity		0.015	%FS Repeatability		0.006	%FS Hysteresis		0.014	%FS	

Digital Indicator Accuracy 0.00001 volts Intense power supply \_\_\_\_\_

date 3/1/2010 Air pressure \_\_\_\_\_ kPa Temperature 35 °C Humidity 75 %

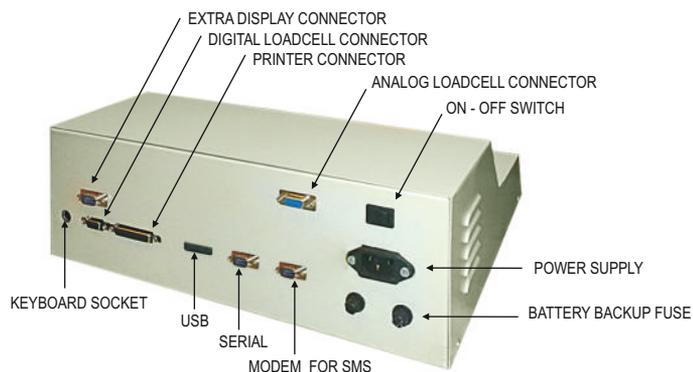
Checked by \_\_\_\_\_ Testing \_\_\_\_\_ Collation \_\_\_\_\_

## SIC Digital Indicator

Sansui Electronic Weighbridge Terminal is specially designed to withstand all environmental conditions prevailing in the weigh-cabin. The unit can operate easily at temp. upto 60°C. Thus no air-conditioning is required for weigh cabin.

The SIC Indicator is interfaced with an IBM Keyboard for data entry which is standard and available any where. Hence has advantage over feather touch type of key/keyboards, which are custom built and have very short life.

Thus, the keyboard used in Sansui weighbridge is user friendly. The terminal is equipped enough to provide detailed print ticket without using a PC (however, it is also PC compatible). The whole set is compact enough to be placed on a 3x2 ft. table



## Weighbridge Terminal

### Advantage of Digital Loadcell Weighbridge with Digital Indicator Over Analog Loadcell Weighbridge with Analog Indicator.

- Easy to Install & No Calibration / Corner Correction Required at site
- Digital O/P which sends weight directly in step of 1 kg in digital format where in analog loadcells, the output in m/v, no analog signal
- Since the output is digital thus the problems related to loadcell cable such as moisture, temperature are completely eliminated. This is the most important advantage over weighbridges using analog loadcell
- In Digital loadcells different lengths of different loadcell cables does not influence the calibration and cornering whereas this is very critical in analog loadcells.

Very high stability. The more numbers of loadcells in a weighbridge, better will be its resolution and so the accuracy, as counts of each loadcells are added together. Whereas in analog loadcells the outputs of each loadcells are averaged (integrated) in the junction box and the effective output is then input to the analog indicator.

#### Easy After Sales Service:

If one of the analog loadcells in a weighbridge goes faulty then the complete wiring has to be removed from the conduit Pipes as well as the junction box for fault finding. In digital the output of each loadcell is seen on the Indicator separately and thus ease of fault findings.

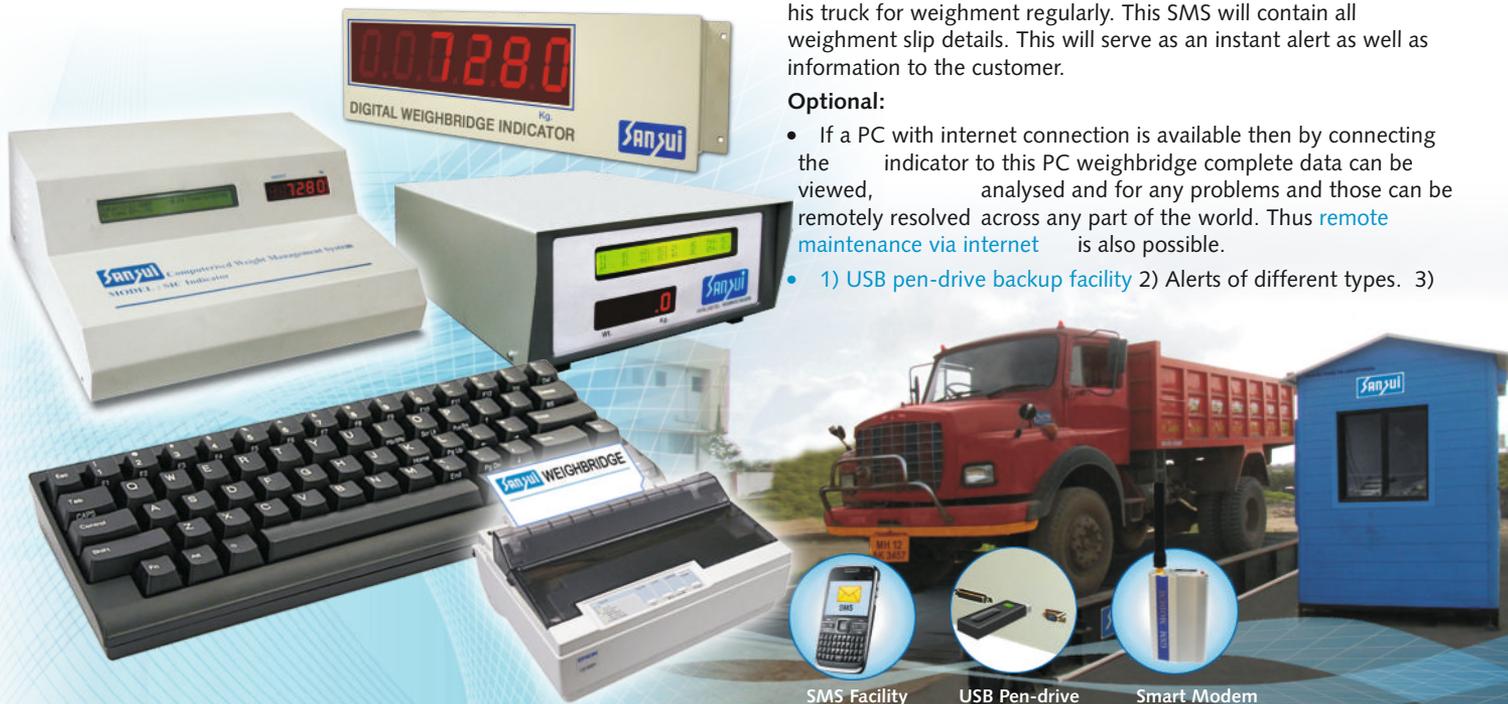
#### Plug & Play adaptability:

In analog loadcell based weighbridge if any single loadcell is replaced then again it requires cornering as well as calibration. Thus this being a very costly and time consuming operation as it would require placing a minimum of 1/3<sup>rd</sup> of the weights of the full capacity of the weighbridge on the platform whereas in digital loadcells they can be replaced without disturbing the cornering and calibration.

The above point clearly indicates that with digital loadcells any unskilled person can replace the loadcells which is not so with analog loadcells, thus eliminating the need of costly experienced service engineer, they are also provided with diagnostic LED.

## Features

- Self diagnostic routine with Auto zero tracking, Real Time Clock (RTC), Full Tare capability.
  - **Battery backup with inbuilt charger.**
  - PC not required for processing & data management.
  - **O/P of individual loadcells is displayed on indicator's LCD screen along with total weight.** Thus very easy for trouble shooting and diagnostic.
  - Non volatile memory up to **20,000 dual transactions record.**
  - 16 character LCD display for date, time & weight.
  - 101 key IBM key board for data entry.
  - 13mm LED display & optional parallel 2 inch LED 7 segment Red LED display.
  - RS-232C port to connect indicator to computer. Data can be converted into Excel format
  - Digital calibration in 3 types a) 2step b) 10step c) Smart calibration.
  - Customer friendly weighing ticket printouts with editable heading.
  - Daily reports are available in 5 different types. 1) Date wise 2) Customer ID wise 3) Material wise 4) Charge wise 5) vehicle wise
  - **10 different operator ID's can be generated having different operator Passwords.** Separate password provided for weighbridge owner or the administrator. Thus collection can be tracked operator-wise. Important functions such as delete records, setting of parameters etc., are possible only with administrator password.
  - Stored calibration data in the loadcell as well as intelligent terminal.
  - **One can generate predefined Party codes, Material codes, (@ XXX Nos).** Thus it will be easier for the operator to use these predefined codes without entering data the same again & again. Thus user friendly and **fast operation for Weighbridge operator**
  - **SMS Facilities:** These are two types of SMS to weighbridge owner. SMS of the previous days collection will be sent automatically. SMS can be automatically sent to a regular customer who sends his truck for weightment regularly. This SMS will contain all weightment slip details. This will serve as an instant alert as well as information to the customer.
- Optional:**
- If a PC with internet connection is available then by connecting the indicator to this PC weighbridge complete data can be viewed, analysed and for any problems and those can be remotely resolved across any part of the world. Thus **remote maintenance via internet** is also possible.
  - 1) USB pen-drive backup facility 2) Alerts of different types. 3)



# Strength & Performance

## Typical Comparison of ISMB V/s NPB



Description	Kg./m Section Wt.	mm H	mm B	mm tw	mm tf	mm R	Moment of Inertia		Sectional Modulus	
							Xaxis	Yaxis	Xaxis	Yaxis
ISMB450	72.4	450	150	9.4	17.4	15/7.5	30400	834	1350	111
*NPB450X190X67.2	67.2	447	190	7.6	13.1	21	29795	1502	1331	158

\*PFB is Parallel Flange Beam

\*NPB is Narrow Parallel Flange Beam of Jindal Make

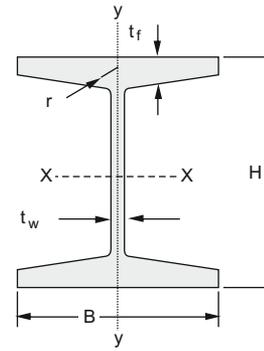
From the above table it is clear that even though the weight per metre of \*NPB 450X190X67.2 is lesser than the standard ISMB450 ('I' Girder), just due to the higher root radius 'r' of 21 over and above 15 or 7.5 of the ISMB450 and so also the longer flange width of 190mm of \*PFB450 over and above 150mm of ISMB450, the moment of inertia about the Y axis which is in the vertical direction of loading in a weighbridge, is almost twice that is 1502 in PFB (instead of 834 in ISMB450)

Thus for lesser weight per running metre in a parallel flange beam the strength is almost 1.5 to 1.75 times with respect to an equivalent size beam in ISMBs.

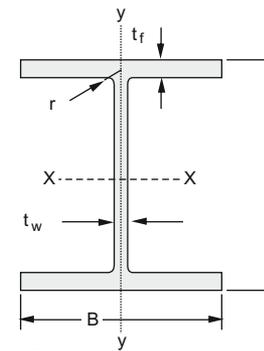
Also the local buckling ratio for the flange in PFB which is  $\frac{B}{2t_f}$  is more in PFB than ISMB sections

Also the local buckling ratio of web =  $d/t_w$ , where ( $d=H-2t_f-2r$ ) is higher in PFB than ISMB sections

So PFB are very efficient in terms of strength, workability and economy (lesser weight per running metre). Though the strength of PFB being more than 1.75 times the same size ISMB the only disadvantage being that the Rates per Kg of PFB are very high as it requires a very good latest state of art plant with very high investments. But the strength achieved in PFB makes up much more times than the high cost.



ISMB



NPB

### Platform

The sturdy and strong mild steel platform is safeguard against lateral and sway movements. The platform is available in either pit type or pitless type to adjust to your space availability.

### Pit type Weighbridge

- 1 Flushed to ground level
- 2 Suitable if there is a space limitation
- 3 No ramp required

### Pitless type Weighbridge

- 1 Surface mounted, hence very economical
- 2 Easy maintenance as platform is completely above ground level
- 3 No high water table or drainage problem
- 4 Approach by low angle ramps

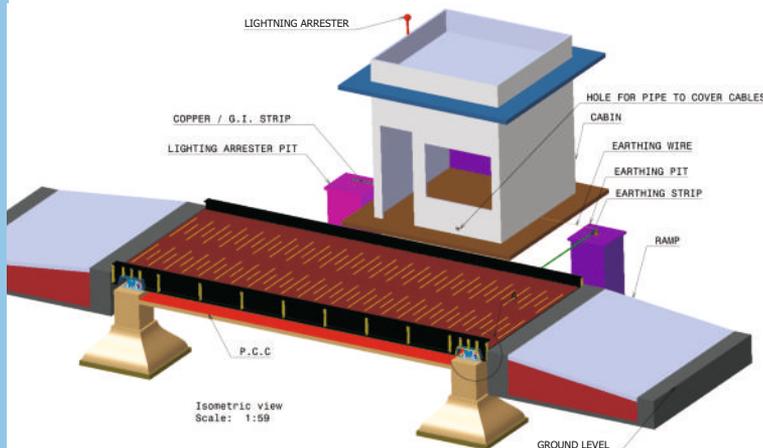


Pit Type

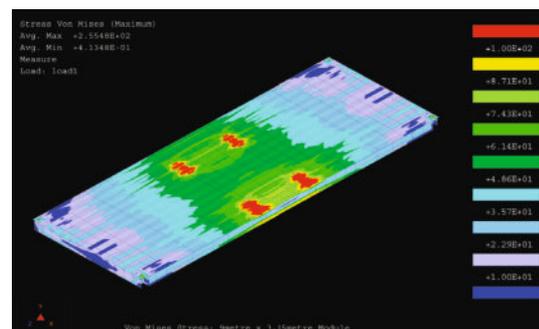


Pitless Type

### Weighbridge Isometric View



Isometric view  
Scale: 1:50



Stress analysis of weighbridge structure

# Orthotropic U-beam weighbridges

Standard size of Indian trucks restrains simple transport of usual I-beam weighbridges. To overcome this problem Orthotropic U-beam weighbridges are replacing traditional I-beam type. Decks with various stiffnesses in longitudinal and transverse bearings are called 'orthotropic'. The Orthotropic Weigh Bridge is an imaginative development for weighbridges that offers amazing auxiliary qualities. An orthotropic bridge or orthotropic deck is one whose deck typically comprises a structural steel deck plate solidified either longitudinally or transversely. Hence called as U-beam because of their shape.



## Specifications:

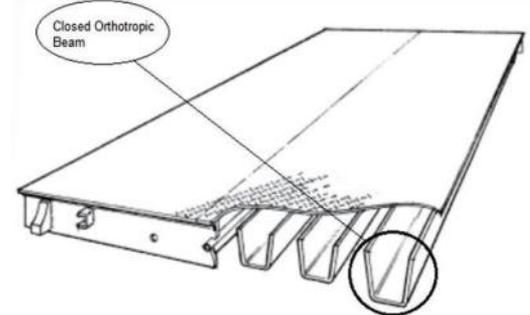
- Orthotropic weighbridges have higher quality contrasted with common I-beam structure.
- Orthotropic weighbridges cost effective than traditional I-beam weighbridges.
- They have higher pressure bearing quality and higher life expectancy.
- They have robust construction and are efficient to directly bear vehicular loads.
- The easy transport of these type of weighbridges have increased their demand in overseas project and are being widely exported by Sansui Electronics Pvt Ltd across the globe.

## Features:

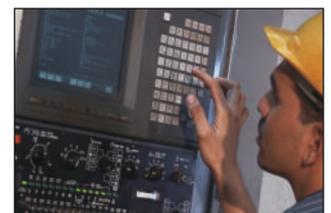
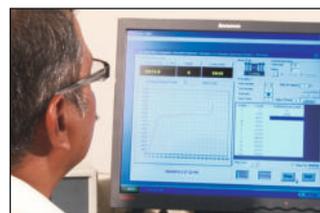
- **No Corrosion:** The less open space accessible in the orthotropic design helps in avoiding air and water to come inside. This way the beam is resistant to the corrosion that can occur and affect the performance of entire weighbridge.
- **Easy Transport:** They can be transported effortlessly as can be consumed inside standard measured trucks. They play a major role in interstate domestic and export orders as transport becomes easy.
- **Longer life:** The closed rib design resists metal fatigue because there are no welds in the areas of the bridge that experience greatest stress. These continuous welds also increase the life of weighbridge.
- **Higher accuracy:** The closed-rib orthotropic section geometry offers even load distribution throughout the structure. When there is concentrated loading on the structure, there is minimum deflection and the load is always transferred vertically on the load cells. This results in highly accurate weighment.



## CLOSED ORTHOTROPIC BEAM



## Infrastructure & Manufacturing Facility



Automatic Calibration facility for Loadcells.



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