

## LOAD CELL ASSEMBLY FOR TANK AND VESSEL WEIGHING

*capacities 2t - 200t*



Vessel weighing problems solved simply and cost effectively. The VC3500 double ended shear beam load cell, with its robust mounting accessory, is designed particularly for large silos and tanks and it incorporates a high anti-lift-off strength. The VC3500 is also available with ATEX or IECEx certification and a high temperature option. The mounting accessory mechanical characteristics have been designed and calculated using Eurocode 3 (EN 1993).

EN 1090 certification with CE marking\* is available on selected versions. Up to 75 tonnes capacity, jacking bolts are fitted to assist with installation and any routine maintenance required.

End use industries include cement, food, minerals, chemicals, plastics, pharmaceutical, paint, biomass and offshore.

- Stainless steel double shear beam load sensor
- Optional 4 - 20mA output
- Low profile
- Integral lift off prevention
- High durability PU mud & chemical resistant cable
- Fully welded construction IP68 / IP69K
- Resistant to off-axis loading
- 5 year warranty
- Allows vessel expansion / contraction
- Optional galvanized or stainless steel mounting accessory
- ATEX or IECEx certification for all zones
- Mounting accessory designed using Eurocode 3
- EN 1090 certification with CE marking available on selected versions

# VC3500

installation & dimension details...

## THE CONCEPT

The VC3500 family of load cells is available in capacities from 2000kg to 200,000kg. They are especially suitable for high capacity vessel weighing and feature a combined error specification of  $< \pm 0.03\%$ .

The critical sensor element is a fully welded double ended shear beam, manufactured from high tensile 17-4 PH stainless steel that is heat treated to give a high ultimate tensile strength. This heat treatment provides an extremely stable platform for the strain gauges, resulting in excellent accuracy and repeatability.

In common with all Thames Side load cells, the strain gauged element is temperature compensated to ensure accuracy is maintained over a wide temperature range.

Stainless steel diaphragms are TIG welded in position to provide total environmental sealing. This method of construction, together with the fitting of a high quality cable gland, allows Thames Side to offer a 5 year warranty on the complete unit.

The mounting accessory has a tough, durable, paint finish as standard to provide a high level of protection. Galvanized alloy steel or stainless steel mounting accessories are available as an option.

The bi-directional freedom of movement of the top plate allows for a high degree of misalignment in the vessel support structure. This is particularly important in large structures where dimensional accuracy, rigidity and angular conformity cannot be guaranteed, or where large changes in ambient temperature are anticipated.

The complete VC3500 weighing assembly incorporates lift-off protection, reducing the need in many cases for additional restraints. Integrated jacking bolts on capacities up to 75t facilitate simple installation and routine maintenance. This eliminates the need for time-consuming and expensive installation work, giving a very cost effective total solution.

Due to the unique design of the VC3500, transverse and non-axial misalignment errors are minimised.

## ATEX and IECEx CERTIFICATION

The VC3500 range has a number of ATEX and IECEx certifications, several of which allow their use without safety barriers – resulting in significant cost savings;

Cert.	Code	Safety Parameters	Key Points
ATEX	II 1 GD Ex ia IIC T6 Ga Ex ia IIIC T70°C Da	Ui=30 V, Pi=1.3 W Ci=2.4 nF, Li=8 µH	Suitable for all dust and gas zones but requires safety barriers.
IECEx	Ex ia IIC T6 Ga Ex ia IIIC T70°C Da		
ATEX	II 3 G Ex nA IIC T6 Gc -20°C ≤ Ta ≤ +60 °C	Ui=30 V, Pi=1.3 W Ci=2.4 nF, Li=8 µH	Suitable for Gas zone 2 only. No safety barriers are required. Refer to certificate for further details.
ATEX	II 1 D Ex ta IIIC T80°C Da IP6X -20°C ≤ Ta ≤ +60 °C	Um=18 V	Suitable for all dust Zones: 20, 21 and 22. No safety barriers are required. Excitation voltage must be below 18V. Safe ambient temperature range is from -20°C to +60°C.

For details of the certification relating to a specific product code, please refer to the documentation included in the "ATEX and IECEx Approved Products" section of our website.

## HIGH TEMPERATURE

The VC3500 range is available in a high temperature variant that utilises special load cell components and a PTFE 'Teflon' cable for operation in environments up to 150°C.

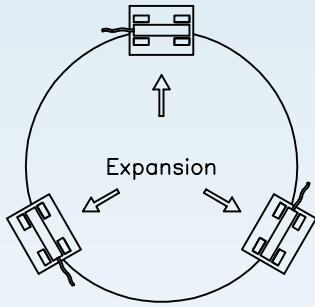
## ENVIRONMENTAL PROTECTION

A special Parylene coating can be specified as an option to provide additional protection in extreme environments where stress corrosion could occur, for example where chlorine or acids are present.

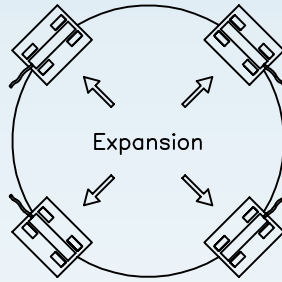
## AMPLIFIED OUTPUT

An integral 4-20mA amplified output can be specified as an option where required.

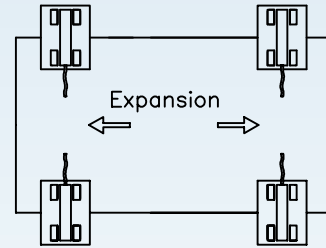




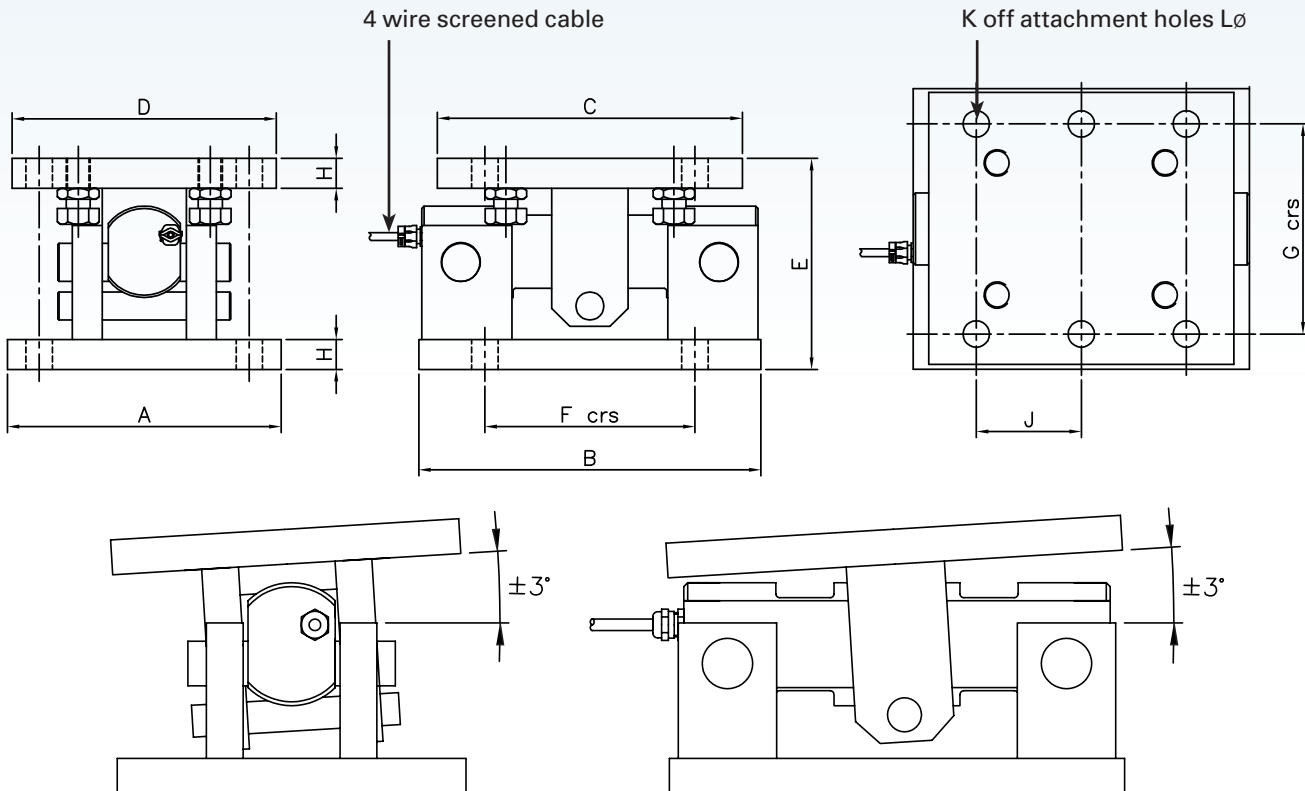
Circular Vessel, 3 Leg Supports  
VC3500 3 x Load Cell Installation



Circular Vessel, 4 Leg Supports  
VC3500 4 x Load Cell Installation



Horizontal Vessel, 4 Supports  
VC3500 4 x Load Cell Installation



Load Cell Capacity (t)	A	B	C	D	E	F crs	G crs	H	J crs	K No	L Ø											
2	180	235	235	180	137	155	140	20	-	8	18											
5																						
7.5																						
10																						
15																						
20	250	300	250	220	210	175	175	25	-	8	22											
30																						
50																						
75																						
100												350	450	440	350	275	300	235	30	150	12	26
150																						
200	350	440	440	350	325	310	285	30	155	12	32											
200																						

NOTE: No jacking bolts on 100t, 150t and 200t capacities.  
A smaller body size 30t version of the VC3500 load cell is available only on the MasterMount® assembly

# VC3500

technical specification...

## VC3500 Load Cell

	Load cell specification	Units
Full Load Output	2.0	mV/V $\pm$ 0.25%
Excitation - Recommended	10	V
Excitation - Maximum	18	V
Safe Service Load	150	%*
Ultimate Overload	300	%*
Combined Error	$< \pm 0.03$	%*
Repeatability	$< \pm 0.015$	%*
Output at Zero Load	$< \pm 2.0$	%*
Input Resistance	785	$\Omega \pm 20$
Output Resistance	705	$\Omega \pm 5$
Operational Temperature Range	-50 to +80	$^{\circ}\text{C}$
Compensated Temperature Range	-10 to +40	$^{\circ}\text{C}$
Temperature Coefficient on Zero	$< \pm 0.002$	%* / $^{\circ}\text{C}$
Temperature Coefficient on Span	$< \pm 0.0012$	%* / $^{\circ}\text{C}$
Environmental Protection	IP68 / IP69K	
Cable Length	20	m
Cable Material	Polyurethane	
Insulation	$> 5000$	M $\Omega$ @ 100V

\*All percentages are related to Full Rated Load

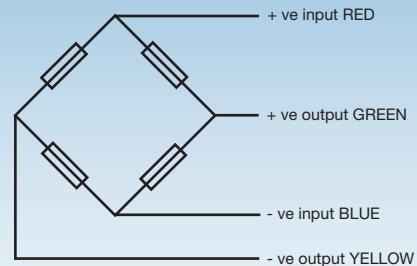
## LA3500 Mounting Accessory

Loading limits for Painted and Galvanized Alloy Steel accessories (load cell installed)

Mounting Assembly	Load Cell Capacity (t)	Deflection at capacity (mm)	Allowable expansion across assembly (mm)	Maximum Vertical Load (kg)	Maximum End Load (kg)	Maximum Transverse Load (kg)	Maximum Lift-off (kg)
LA3500 - 20T	2	0.20	$\pm 5$	79538 <sup>A</sup>	10800	4000	3202
	5	0.20					
	7.5	0.25					
	10	0.25					
	15	0.30					
LA3500 - 50T	30	0.50	$\pm 9$	96873	28042	10910	18355
	50	0.50		132560			
LA3500 - 75T	75	0.80	$\pm 9$	173352	35690	8872	29572
LA3500 - 100T	100	0.80	$\pm 12$	263087	39260	11727	19885
LA3500 - 200T	150	0.90	$\pm 12$	538410 <sup>AA</sup>	87002	17285	61937
	200	0.90					

Loading limits calculated according to Eurocode 3 (EN 1993). Limits for Stainless Steel accessories (LA3500-\*\*\*\*-SS) available on request.

<sup>A</sup>With 20t load cell installed <sup>AA</sup>With 200t load cell installed



### Electrical Connections

Via 4 core, 16 / 0.2mm, 5.7mm outer diameter, screened polyurethane cable (halogen-free and resistant to oil drilling mud)

Cable length 20m

Screened not connected electrically to load cell

### Construction

Load cell VC3500

High strength stainless steel type 17-4PH

Mounting accessory LA3500

- Painted alloy steel version (LA3500-\*\*\*\*-P)  
Upper & lower plates: alloy steel, durable black painted finish  
Pins: corrosion resisting hardened stainless steel  
Clips: plated alloy steel
- Galvanized alloy steel version (LA3500-\*\*\*\*-G)  
Upper & lower plates: alloy steel, galvanized finish  
Pins: corrosion resisting hardened stainless steel  
Clips: plated alloy steel
- Stainless steel version (LA3500-\*\*\*\*-SS)  
Upper & lower plates: stainless steel  
Pins: corrosion resisting hardened stainless steel  
Clips: stainless steel

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