Procon Engineering

(A Division of National Oilwell Varco UK Limited)

Type LP44 load cell assembly for Silo, Tank and Vessel Weighing

Capacities 2te to 200te

- **Fully welded construction IP68 /IP69K**
- **Stainless steel double shear beam load sensor**
- **Low profile**
- **High durability PU mud & chemical resistant cable**
- **Resistant to off-axis loading**
- **Optional stainless steel mounting accessory**
- **Allows vessel expansion / contraction**
- **ATEX or IECEx certification for all zones**

Vessel weighing problems solved simply and cost effectively. The LP44 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 LP44 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 user industries include cement, food, minerals, chemicals, plastics, pharmaceutical, paint, biomass, offshore and utilities.

All Procon Engineering load cells come with a 3 year warranty.

LP44 Load Cell Assembly

Technical Specification Sheet

The Concept

The LP44 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 < ± 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 Procon 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. The mounting accessory has a tough, durable, paint finish as standard to provide a high level of protection. Painted 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 LP44 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 LP44, transverse and non-axial misalignment errors are minimised.

ATEX and IECEx Certification

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.

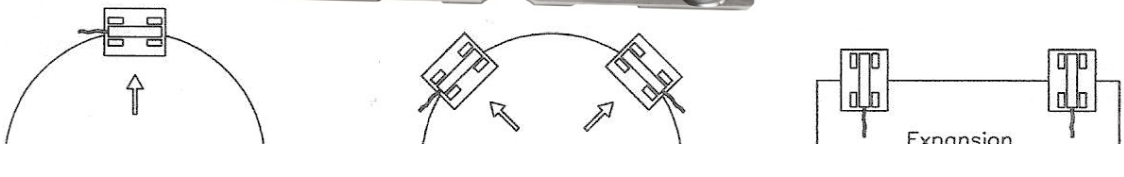
The LP44 range has a number of ATEX and IECEx certifications, several of which allow their use without safety barriers – resulting in significant cost savings.

High Temperature

The LP44 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 50°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.



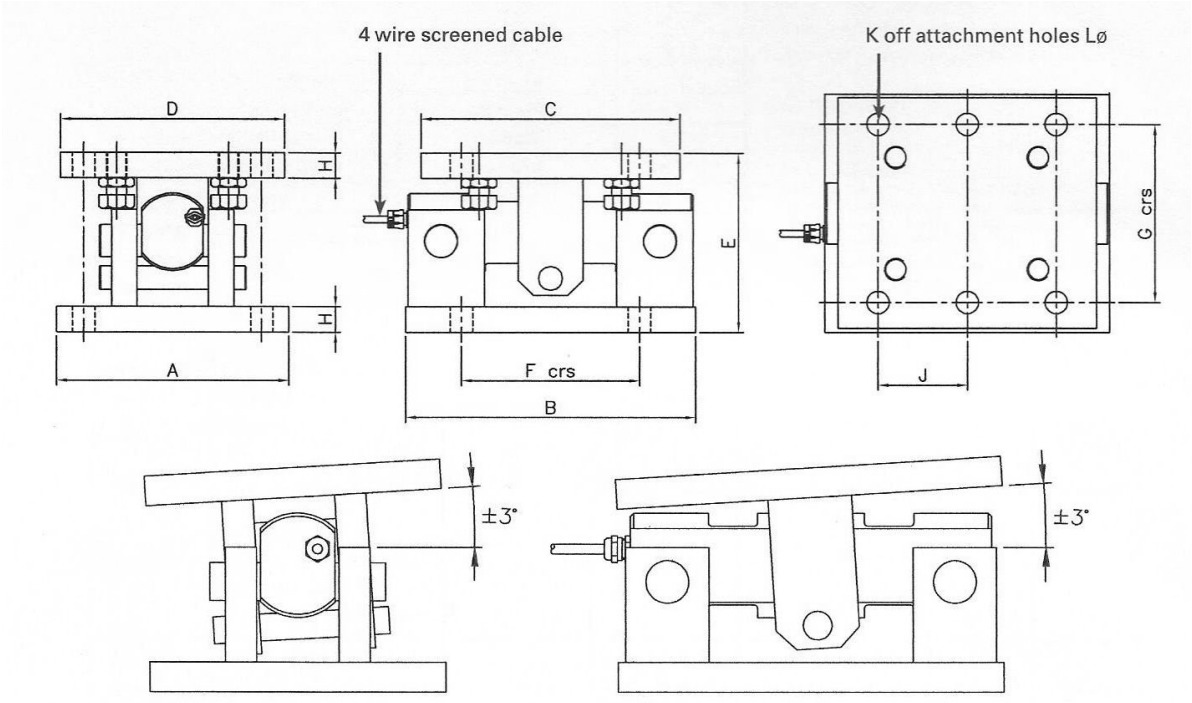
LP44 Load Cell Assembly

Technical Specification Sheet

Circular Vessel, 3 leg supports
LP44, 3 x Load Cell Installation

Circular Vessel, 4 leg supports
LP44, 4 x Load Cell Installation

Horizontal Vessel, 4 supports
LP44, 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											
30	250	300	250	220	210	175	175	25	-	8	22
50											
75	250	360	330	250	250	200	180	25	100	12	22
100	350	450	440	350	275	300	235	30	150	12	26
150	350	440	440	350	325	310	285	30	155	12	32
200											

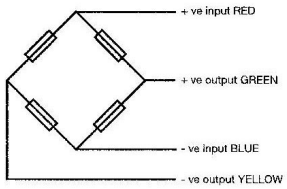
Note: No jacking bolts on 100t, 1560t and 200t capacities

A smaller body size 30t version of the LP44 load cell is available on the MasterMount® assembly

LP44 Load Cell Assembly

Technical Specification Sheet

	Load cell specification	Units
Full Load Output	2.0	mV/V ± 0.25%
Excitation - *Recommended*	10	V
Excitation - *Maximum*	18	V
Safe Service Load	150	%*
Ultimate Overload	300	%*
Combined Error	< ± 0.03	%*
Repeatability	< ± 0.015	%*
Output at Zero Load	< ± 2.0	%*
Input Resistance	785	Ω ± 20
Output Resistance	705	Ω ± 5
Operational Temperature Range	-50 to +80	˚C
Compensated Temperature Range	-10 to +40	˚C
Temperature Coefficient on Zero	< ± 0.002	%* / ˚C
Temperature Coefficient on Span	< ± 0.0012	%* / ˚C
Environmental Protection	IP68 / IP69K	
Cable Length	20	m
Cable Material	Polyurethane	
Insulation	>5000	MΩ @ 100V
Procon Engineering's load cells are supplied with a 3 year warranty		



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 LP44 High strength stainless steel type 17-4PH

Mounting accessory

- Painted alloy steel version: Upper & lower plates: alloy steel, durable black painted finish Pins: corrosion resisting hardened stainless steel Clips: plated alloy steel
- Stainless steel version: Upper & lower plates: stainless steel Pins: corrosion resisting hardened stainless steel Clips: stainless steel

LP44 Mounting Accessory

Loading limits for Painted Steel accessories (with 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 Traverse Load (kg)	Maximum Lift-off (kg)
LP44 20T	2	0.20	± 5	79538Δ	10800	4000	3202
	5	0.20					
	7.5	0.25					
	10	0.25					
	15	0.30					
	20	0.40					
LP44 50T	30	0.50	±9	96873	28042	10910	18355
	50	0.50		132560			
LP44 75T	75	0.80	± 9	173352	35690	8872	29572
LP44 100T	100	0.80	± 12	263087	39260	11727	19885
LP44 200T	150	0.90	± 12	538410ΔΔ	87002	17285	61937
	200	0.90					

Loading limits calculated according to Eurocode 3 (EN 1993). Limits for Stainless Steel accessories available on request.
Δ With 20t load cell installed
Δ Δ With 200t load cell installed

Procon Engineering's policy is one of continuous product enhancement.
We therefore reserve the right to incorporate technical modifications without prior notification. E&OE. *Issue No:2018-01*

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