APPLIED MEASUREMENTS LTD.
Transducer Specialists...

+44 (0) 118 981 7339
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https://appmeas.co.uk

DDEN Submersible Miniature In-Line Load Cell

Key Features:

- Capacities 0-50N up to 0-50kN
- Fully Submersible: IP68 to 10m
- Tension and Compression
- Output: 0.5mV/V to 2mV/V
- Accuracy: <±0.15%/RC (0.05% typical)
- Optional Integral Amplifier
- Low Profile and Very Compact
- Integral Male Threads for In-Line Mounting
- High Natural Frequency
- Low Deflection
- Robust Construction
- 3 Year Warranty

Low Profile Fully Submersible Load Cell for use in Tension and Compression

The DDEN series of submersible in-line load cells are designed for use in both tension and compression. It is sealed to IP68 environmental protection rating with 'O' rings to provide integrity at depths of up to 10 metres as standard. Greater depths and customised version can be provided, please speak to our sales team.

The DDEN fully submersible load cell is designed to be used underwater or in areas subject to high humidity or the risk of flooding. Current applications include wave tank measurement systems and mooring buoy cable tension monitoring. The DDEN's low profile and compact design, enables its use in applications with restricted mounting space, where other in-line load cells such as the s-beam load cells are too large.

The DDEN's low deflection and high natural frequency results lends it to material testing applications and cable tension monitoring applications.

If an internal amplifier is needed we offer a DDENA variant. The DDENA can incorporate any of the ICA series amplifiers to provide a high-level analogue output signal such as 0.1-10Vdc or 4-20mA.

Options:

- Non-Standard Dimensions
- Higher Capacities to 1000kN/100te+
- Spherical Seating Rod End Bearings
- Female Adaptor Available on Request
- Compression Fittings Available
- Integral ICA Series Amplifiers
- Integral DCell RS485 Signal Digitiser
- USB Versions (via DSC-USB)
- TEDS (Transducer Electronic Data Sheet)
- TEDS Allows Plug & Play with TEDS Enabled Instrumentation
- Single or Multi-Channel PC-Based Monitoring & Data Logging System
- Wireless Version (via T24 instrumentation)
- Fatigue Rated Versions
- Marine & Seawater Compatible Versions

Applications:

- Materials Testing
- Cable Tension Monitoring
- Submersible Applications
- Locations with High Humidity
- Locations Susceptible to Flooding
- Marine Testing
- Hydrodynamic Testing

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Specification:

Rated Capacity (RC)	N	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2000, 0-5000, 0-10,000, 0-20,000, 0-50,000
Operating Modes	Tension/Compression / Tension & Compression	
Sensitivity (RO)	mV/V (nominal)	50N = 0.5 / 100N=1.0 / 250N = 0.75 / 500N = 1.5 / 1000N up = 2.0
Zero Balance/Offset	±%/Rated Output	<1.0
Output Symmetry (tension vs. compression)	±%/Rated Output	<0.25 typical
Non-Linearity	±%/Rated Output	<0.15 (0.05 typical)
Hysteresis	%/Rated Output	<0.15 (0.05 typical)
Repeatability	±%/Rated Output	<0.1
Temperature Effect on Zero	±%/Rated Output/ ˚C	<0.005
Temperature Effect on Sensitivity	±%/Applied Load/ ˚C	<0.005
Input Resistance	Ohms	700
Output Resistance	Ohms	700
Insulation Resistance	Megohms	>5000 @ 50Vdc
Excitation Voltage	Volts AC or DC	10 recommended (2-15 acceptable)
Operating Temperature Range	˚C	-20 to +80
Compensated Temperature Range	˚C	0 to +70
Storage Temperature Range	˚C	-20 to +80
Safe Overload	% of Rated Capacity	150
Ultimate Overload	% of Rated Capacity	200
Deflection @ Rated Capacity	mm	50N=0.08; 100N=0.12; 250N=0.09; 500N=0.06; 1000N=0.04; 2000N=0.03; 5000N=0.02; 10,000N=0.015; 20,000N=0.01; 50,000N=0.03
Fundamental Resonant Frequency*	kHz	50N=1.7; 100N=1.3; 250N=0.72; 500N=1.18; 1000N=2; 2000N=3.1; 5000N=6.1; 10,000N=9.9; 20,000N=18.2; 50,000N=13.3
IP Rating (Environmental Protection)		IP68 to 10m depth (please consult sales for greater depths)
Weight (excluding cable)	kg	50N to 20kN: 0.3kg / 50kN: 0.45kg,
Fatigue Life		10^8 cycles typical (10^9 cycles on fatigue-rated version)
Cable Length (as standard)	metres	2
Cable Type		4-core screened submersible, PUR (weight: 82g/m) sheath, Ø7.5
Construction Materials / Wetted Parts		17-4PH Stainless Steel, 303 Stainless Steel, PUR, NBR
Resolution		1 part in 250,000 (with appropriate instrumentation)
Pressure Effect on Output		9N/mH²O nominal

*The resonant frequency is calculated with the body of the load cell attached to a large plate, ensuring that only the sensing element oscillates: This is vital to achieve the highest natural frequency and subsequent frequency response.

Wiring Diagram:

Wire	Designation
Red	+ve excitation
Blue	-ve excitation
White	+ve signal (tension)
Yellow	-ve signal

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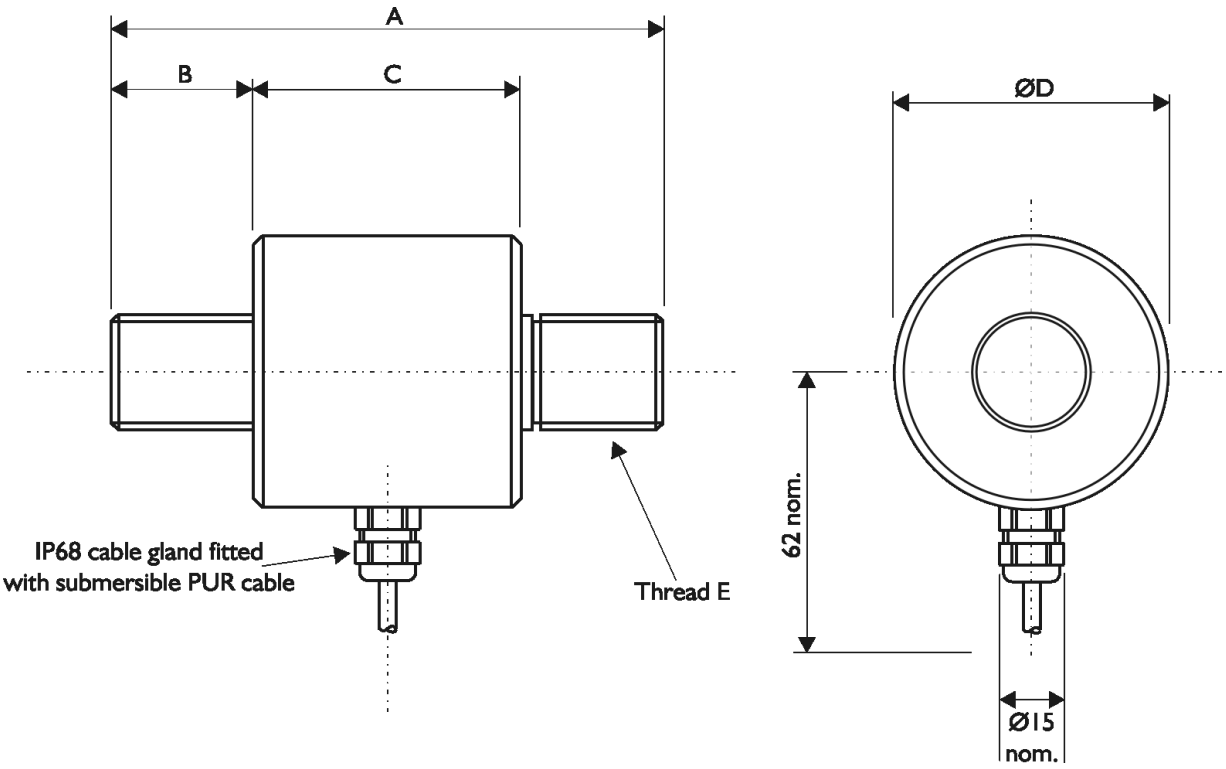
Dimensions (mm):

MODEL	CAPACITY (N)	A	B	C	ØD	E
DDEN	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2000, 0-5000, 0-10,000, 0-20,000	67	15	35	44	M12 x 1.75
DDEN	0-50,000	71	18	35	44	M16 x 2.0
DDENA	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2000, 0-5000, 0-10,000, 0-20,000	67	15	35	44	M12 x 1.75
DDENA	0-50,000	71	17	37	50	M16 x 2.0



Ordering Codes:

Core Product	Capacity (inc Engineering Units)	Cable Length (m)	Specials Code	Example Result
DDEN	50N	002	000	DDEN-50N-002-000
DDEN	100N	002	000	DDEN-100N-002-000
DDEN	250N	002	000	DDEN-250N-002-000
DDEN	500N	002	000	DDEN-500N-002-000
DDEN	1000N	002	000	DDEN-1000N-002-000
DDEN	2000N	002	000	DDEN-2000N-002-000
DDEN	5000N	002	000	DDEN-5000N-002-000
DDEN	10kN	002	000	DDEN-10kN-002-000
DDEN	20kN	002	000	DDEN-20kN-002-000
DDEN	50kN	002	000	DDEN-50kN-002-000

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Core Product	Capacity (inc Engineering Units)	Cable Length (m)	Specials Code	Example Result
DDENAXX	50N	002	000	DDENAXX-50N-002-000
DDENAXX	100N	002	000	DDENAXX-100N-002-000
DDENAXX	250N	002	000	DDENAXX-250N-002-000
DDENAXX	500N	002	000	DDENAXX-500N-002-000
DDENAXX	1000N	002	000	DDENAXX-100N-002-000
DDENAXX	2000N	002	000	DDENAXX-2000N-002-000
DDENAXX	5000N	002	000	DDENAXX-5000N-002-000
DDENAXX	10kN	002	000	DDENAXX-10kN-002-000
DDENAXX	20kN	002	000	DDENAXX-20kN-002-000
DDENAXX	50kN	002	000	DDENAXX-50kN-002-000
Note: XX is replaced by ICA amplifier code, i.e. 2H = ICA2H amplifier.				
Available ICA amplifiers:				
ICA1H		0.1 - 10Vdc	3 - wire	1H
ICA2H		0.1 - 5Vdc	3 - wire	2H
ICA3H		±10Vdc	3 - wire, bi-polar supply	3H
ICA4H		4 - 20mA	3 - wire	4H
ICA5S		4 - 20mA	2 - wire, loop-powered	5S
ICA6H		±10Vdc	3 - wire, uni-polar supply	6H

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Associated Products:

TR150 Handheld Indicator

T24 Wireless Telemetry Range

Intuitive4-L Panel-Mount Indicator

DSC-USB USB Signal Digitiser

ICA Miniature Strain Gauge Amplifier

SGA Signal Conditioner/Amplifier

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Mounting and Installation Accessories:

Helping You Get The Best Possible Performance From Your Load Cell.

Rod End Bearings for Tension Use

Designed to align forces through the principle axis of the load cell thus reducing the effects of extraneous forces, hence offering improved performance from the cell.

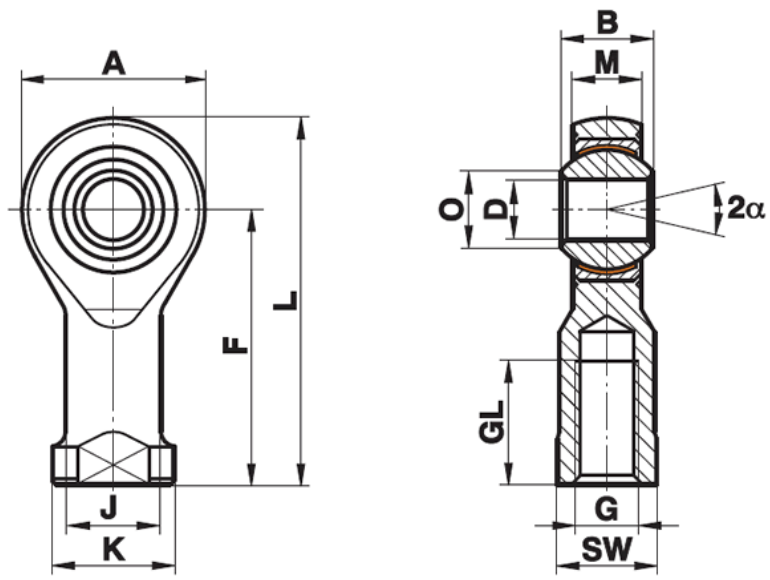
Rod End Bearings are used where tensile forces are being applied.

Maintenance-free rod ends are a complete units made up of a housing with both an integral shank (with an internal or external thread) and a maintenance-free spherical plain bearing, located within the housing.

Key Features:

- Supports radial loads in a tensile or compressive direction.
- Suitable for unilateral loads - can support alternating loads and alternating loads in combination with bearing GE.. UK-2RS, consult sales.
- Stainless Steel for corrosion resistance.
- Are maintenance-free.
- Fitted with radial spherical plain bearings.
- PTFE composite sliding contact surfaces.
- Enables compact adjacent construction thanks to its thin walled design of the eye housing.

Dimensions in mm:



LOAD CELL	ORDERING CODES	Size (D)	B	M	A	F	L	K	J	O	SW	G	GL	Static load C_0 kN	Dynamic load C kN	Limiting Speed rev/min	Weight g
DDEN + DDENA-50N to 20kN	GIRSW-12RR-316	12	16	12.00	32	50	66	22.0	17.5	15.4	19	M12	22	34.5	32.0	300	115
DDEN-50kN	GIRSW-16RR-316	16	21	15.00	42	64	85	27.0	22.0	19.3	22	M16	28	60.5	52.5	230	230