



## N 31E Mid



### Description

Model 31E mid range precision miniature load cells measure both tension and compression load forces of 10 N to 50 N. These models are our highest accuracy, rugged miniature load cells. Model 31E's welded, stainless steel construction is designed to eliminate or reduce to a minimum, the effects of off-axis loads. (The internal construction assures excellent long- term stability for ranges 1000 grams and above.) A modification permits this model to be completely welded for underwater applications. The Model 31E tension/compression load cell has male threads attachments. High accuracies of 0.15 % to 0.25 % full scale are achieved. Each bonded strain gage unit is built of welded 17-4 PH stainless steel for additional ruggedness.

All load cells with ranges to 50 N have an electrical balance module in the lead wire (approximately 1 in x .087 in thick). This balance module does not have to be the same temperature as the transducer.

### Features

- 10 N to 50 N
- mV/V output
- Stainless steel
- Miniature design

## Performance specifications

Characteristic	Measure
Load ranges <sup>6</sup>	10 N to 5 kN
Linearity 10 N to 1 kN	±0.15 % full scale
Linearity 2 kN to 5 kN	±0.2 % full scale
Hysteresis 10 N to 1 kN	±0.15 % full scale
Hysteresis 2 kN to 5 kN	±0.2 % full scale
Non-repeatability 10 N	±0.1 % full scale
Non-repeatability 2 N to 5 kN	±0.05 % full scale
Tolerance on output 10 N	1.5 mV/V (nominal)
Tolerance on output 2 N to 5 kN	2 mV/V
Operation	Tension / compression <sup>3</sup>
Resolution	Infinite

## Environmental specifications

Characteristic	Measure
Temperature, operating	-55 °C to 120 °C [-67 °F to 248 °F]
Temperature, compensated	15 °C to 70 °C [60 °F to 158 °F]
Storage temperature	-70 °C to 150 °C [-100 °F to 302 °F]
Temperature effect, zero	0.01 % full scale / °C
Temperature effect, span	0.01 % full scale / °C

## Electrical specifications

Characteristic	Measure
Strain gage type	Bonded foil
Excitation (calibration) 10 N to 20 N	5 Vdc
Excitation (calibration) 50 N to 5 kN	10 Vdc
Insulation resistance	5000 Mohm @ 50 Vdc
Bridge resistance	350 ohm
Zero balance	1 % max.
Electrical termination (std)	Teflon cable (1,5 m [60 in])

## Mechanical specifications

Characteristic	Measure
Maximum allowable load	150 % FS <sup>1</sup>
Weight	See table
Material	17-4 PH stainless steel
Deflection full scale	See table
Natural frequency	See table

## Range codes

Range codes	Range
010N0	10 N
020N0	20 N
050N0	50 N
100N0	100 N
200N0	200 N
500N0	500 N
01KN0	1 kN
02KN0	2 kN
05KN0	5 kN

## Wiring codes

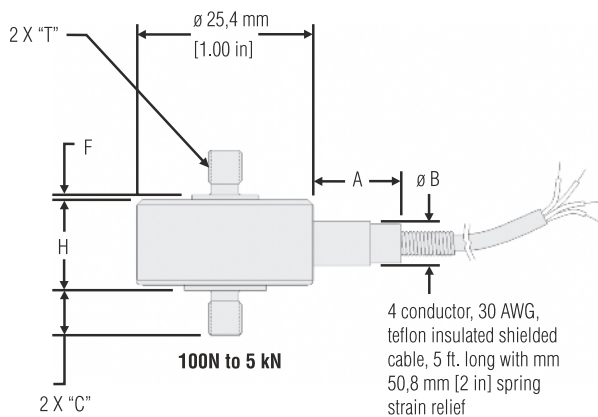
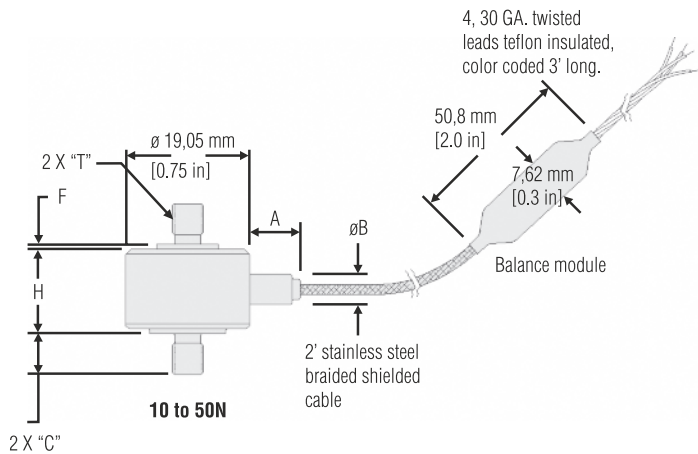
Cable	Unamplified
Red	(+) excitation
Black	(-) excitation
Green	(-) output
White	(+) output

## Deflections and ringing frequencies

Capacity (lb)	Deflection at full scale (in)	Ringing frequency (Hz)	Weight (g)
10 N to 50 N	0,02 mm [0.0008 in]	3000 Hz	21 g
100 N to 500 N	0,02 mm [0.0008 in]	10000 Hz	63 g
1 kN to 5 kN	0,03 mm [0.001 in]	12000 Hz	80 g

## Mounting dimensions

Ranges (lb)	T	H (in)	C (in)	F (in)	A (in)	B (in)
10 N, 20N, 50N	M4x0.7	11,43mm [0.45in]	6,35mm [0.25in]	1,27mm [0.05in]	7,87mm [0.31in]	4,83mm [0.19in]
100 N, 200N, 500N	M5x0.8	13,21mm [0.52in]	6,35mm [0.25in]	0,76mm [0.03in]	12,7mm [0.50in]	6,35mm [0.25in]
1kN, 2kN, 5kN	M6x1	13,21mm [0.52in]	9,65mm 0.38in	0,76mm 0.03in	12,7mm [0.50in]	6,35mm [0.25in]



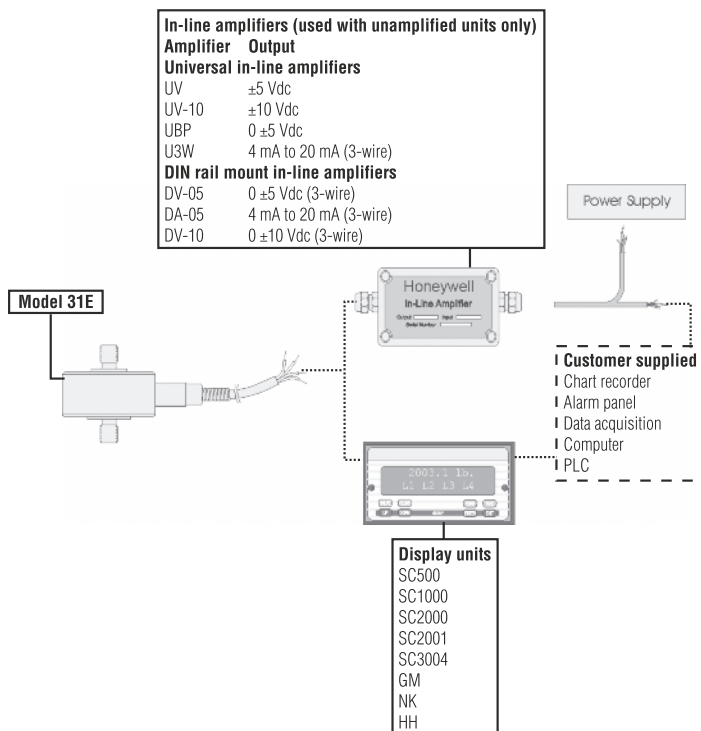
## Option codes

Many range/option combinations are available in our quick-ship and fast-track manufacture Programs.		
Load range	10, 20, 50, 100, 200, 500 N; 1, 2, 5kN	
Temperature compensation	1a. 60°F to 160°F 1b. 30°F to 130°F 1c. 0°F to 185°F 1d. -20°F to 130°F 1e. -20°F to 200°F 1f. 70°F to 250°F 1g. 70°F to 325°F 1h. 70°F to 400°F 1i. -65°F to 250°F 1j. 0°C to 50°C 1k. -20°C to 85°C 1m. -25°C to 110°C	
Internal amplifiers	2u. Unamplified, mV/V output	
Electrical termination	6a. Bendix PTIH-10-6P - 6 pin (max. 250°F) <sup>5</sup> 6d. Microtec DR-4S-4H 4 pin 6e. Integral cable: Teflon 6f. Integral cable: PVC 6g. Integral cable: Neoprene (max. 80°C) 6h. Integral cable: Silicone 6i. Integral underwater cable (max. 180°F) 6v. Phoenix connector on end of cable	
Special calibration	9a. 10 point (5 up / 5 down) 20% increments @ 20°C 9b. 20 point (10 up / 10 down) 10% increments @ 20°C	
Special calibration	30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression	
Shock and vibration	44a. Shock and vibration resistance	
Interfaces <sup>4</sup>	53e. Signature calibration <sup>7</sup> 53t. TEDS IEEE 1451.4 module	

## Notes

1. Allowable maximum loads – maximum load to be applied without damage<sup>2</sup>
2. Without damage - loading to this level will not cause excessive zero shift or performance degradation. The user must consider fatigue life for long term use and structural integrity. All structurally critical applications (overhead loading, etc.) should always be designed with safety redundant load paths.
3. Standard calibration for tension/compression load cells is in tension only.
4. TEDS available with integral cable units only.
5. Availability varies with range.
6. This unit is calibrated to Metric (non-Imperial) units.
7. Signature calibration only available as inline module.

## Typical system diagram



### WARNING - PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**



### WARNING - MISUSE OF DOCUMENTATION

- The information presented in this catalogue is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**