

## Model 31 Low

## Low Range Precision Miniature Load Cell



### DESCRIPTION

Model 31 low range precision miniature load cells measure both tension and compression load forces of 50 grams to 500 g. These models are our highest accuracy, rugged miniature load cells. Model 31'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 31 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.

### FEATURES

- 50 g to 500 g
- mV/V output
- Stainless steel
- Miniature design
- Double diaphragm construction

# Model 31 Low

## PERFORMANCE SPECIFICATIONS

Characteristic	Measure
Load ranges <sup>5</sup>	50 g, 150 g, 250 g, 500 g
Linearity	±0.15 % full scale
Hysteresis	±0.15 % full scale
Non-repeatability	±0.1 % full scale
Tolerance on output 50 g to 150 g	0,1 mV/V max.
Tolerance on output 250 g to 500 g	20 mV/V
Operation	Tension/compression <sup>3</sup>
Resolution	Infinite

## ENVIRONMENTAL SPECIFICATIONS

Characteristic	Measure
Temperature, operating	-53 °C to 121 °C [-65 °F to 250 °F]
Temperature, compensated	15 °C to 71 °C [60 °F to 160 °F]
Storage temperature	-73 °C to 148 °C [-100 °F to 300 °F]
Temperature effect, zero	0.015 % full scale/°F
Temperature effect, span	0.015 % full scale/°F

## ELECTRICAL SPECIFICATIONS

Characteristic	Measure
Strain gage type	Semiconductor
Excitation (calibration)	5 Vdc
Insulation resistance	5000 Mohm @ 50 Vdc
Bridge resistance	500 ohm
Zero balance	1 % max.
Electrical termination (std)	Teflon cable (5 ft)

## MECHANICAL SPECIFICATIONS

Characteristic	Measure
Maximum allowable load	5 lb <sup>1</sup>
Weight	90 g
Material	17-4 PH stainless steel
Deflection full scale	0,020 mm [0.0008 in]
Natural frequency	740 Hz

## WIRING CODES

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

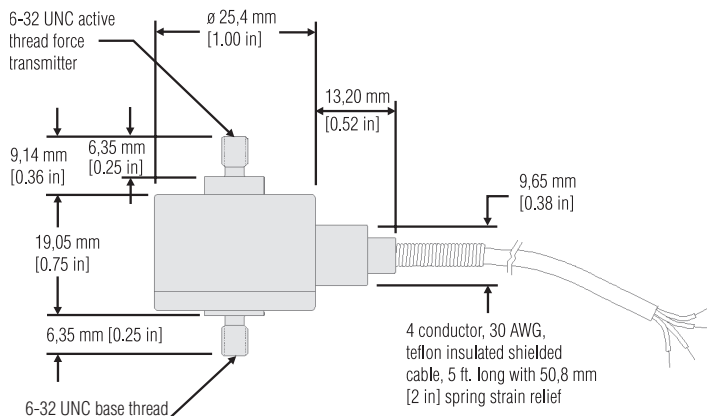
## RANGE CODES

Range Codes	Range
AJ	50 g
AL	150 g
AN	250 g
AP	500 g

## OPTION CODES

	Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please see <a href="http://sensing.honeywell.com/TMsensor-ship">http://sensing.honeywell.com/TMsensor-ship</a> for updated listings.	
<b>Load range</b>	50, 150, 250, 500 g	
<b>Temperature compensation</b>	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 1j. 0 °F to 50 °C 1k. -20 °C to 85 °C 1m. -25 °C to 110 °C
<b>Internal amplifiers</b>	2u. Unamplified, mV/V output	
<b>Overload stops</b>	4a. Overload stop	
<b>Electrical termination</b>	6d. Microtec DR-4S-4H 4-pin 6e. Integral cable: Teflon 6f. Integral cable: PVC 6h. Integral cable: Silicone	6i. Integral underwater cable (max. 82 °C [180 °F]) 6v. Phoenix connector on end of cable 15d. Connector on end of cable
<b>Special calibration</b>	30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression	
<b>Shock and vibration</b>	44a. Shock and vibration resistance	
<b>Interfaces</b> <sup>4</sup>	53e. Signature calibration <sup>6</sup> 53t. TEDS IEEE 1451.4 module	

## MOUNTING DIMENSIONS



# Model 31 Low

## 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 or 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. This unit calibrated to Imperial (non-Metric) units.
6. Signature calibration only available as inline module.

## TYPICAL SYSTEM DIAGRAM



# Low Range Precision Miniature Load Cell

**Warranty.** Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For more information about Sensing and Control products, visit [www.honeywell.com/sensing](http://www.honeywell.com/sensing) or call +1-815-235-6847. Email inquiries to [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

### ⚠ 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

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- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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## Model 31 Mid

### Mid Range Precision Miniature Load Cell



#### DESCRIPTION

Model 31 mid range precision miniature load cells measure both tension and compression load forces of 1000 g to 1000 lb. These models are our highest accuracy, rugged miniature load cells. Model 31'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 31 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 from 1 kg to 10 lb 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

- 1000 g to 1000 lb
- mV/V output
- Stainless steel
- Miniature design

# Model 31 Mid

## PERFORMANCE SPECIFICATIONS

Characteristic	Measure
Load ranges <sup>6</sup>	1000 g, 5 lb, 10 lb, 25 lb, 50 lb, 100 lb, 250 lb, 500 lb, 1000 lb
Linearity 1000 g to 250 lb	±0.15 % full scale
Linearity 500 lb to 1000 lb	±0.2 % full scale
Hysteresis 1000 g to 250 lb	±0.15 % full scale
Hysteresis 500 lb to 1000 lb	±0.2 % full scale
Non-repeatability 1000 g	±0.1 % full scale
Non-repeatability 5 lb to 1000 lb	±0.05 % full scale
Tolerance on output 1000 g	1.5 mV/V (nominal)
Tolerance on output 5 lb to 1000 lb	2 mV/V
Operation	Tension/compression <sup>3</sup>
Resolution	Infinite

## ENVIRONMENTAL SPECIFICATIONS

Characteristic	Measure
Temperature, operating	-53 °C to 121 °C [-65 °F to 250 °F]
Temperature, compensated	15 °C to 71 °C [60 °F to 160 °F]
Storage temperature	-73 °C to 148 °C [-100 °F to 300 °F]
Temperature effect, zero	0.005 % full scale/°F
Temperature effect, span	0.005 % full scale/°F

## ELECTRICAL SPECIFICATIONS

Characteristic	Measure
Strain gage type	Bonded foil
Excitation (calibration) 1 kg to 10 lb	5 Vdc
Excitation (calibration) 25 lb to 1000 lb	10 Vdc
Insulation resistance	5000 Mohm @ 50 Vdc
Bridge resistance	350 ohm
Zero balance	1 % max.
Electrical termination (std)	Teflon cable (1524 mm [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
<b>AR</b>	1000 g
<b>AT</b>	5 lb
<b>AV</b>	10 lb
<b>BL</b>	25 lb
<b>BN</b>	50 lb
<b>BR</b>	100 lb
<b>CN</b>	250 lb
<b>CR</b>	500 lb
<b>CV</b>	1000 lb

## WIRING CODES

Cable	Unamplified
<b>Red</b>	(+) excitation
<b>Black</b>	(-) excitation
<b>Green</b>	(-) output
<b>White</b>	(+) output

## DEFLECTIONS AND RINGING FREQUENCIES

Capacity (lb)	Deflection at full scale (in)	Ringling frequency (Hz)	Weight (g)
1000 g to 10 lb	0,03 mm [0.001 in]	3000 Hz	21 g
25 lb to 100 lb	0,03 mm [0.001 in]	10000 Hz	63 g
250 lb to 1000 lb	0,04 mm [0.0015 in]	12000 Hz	80 g

## Mid Range Precision Miniature Load Cell

### MOUNTING DIMENSIONS

Ranges (lb)	T	H	C	F	A	B
1000 g, 5 lb, 10 lb	#6-32 UNC	11,43 mm [0.45 in]	6,35 mm [0.25 in]	1,27 mm [0.05 in]	7,87 mm [0.31 in]	4,83 mm [0.19 in]
25 lb, 50 lb, 100 lb	#10-32 UNF	13,21 mm [0.52 in]	6,35 mm [0.25 in]	0,76 mm [0.03 in]	12,7 mm [0.50 in]	6,35 mm [0.25 in]
250 lb, 500 lb, 1000 lb	1/4-28 UNF	13,21 mm [0.52 in]	9,65 mm [0.38 in]	0,76 mm [0.03 in]	12,7 mm [0.50 in]	6,35 mm [0.25 in]



### OPTION CODES

	Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please see <a href="http://sensing.honeywell.com/TMsensor-ship">http://sensing.honeywell.com/TMsensor-ship</a> for updated listings.	
<b>Load range</b>	1000 g, 5 lb, 10 lb, 25 lb, 50 lb, 100 lb, 250 lb, 500 lb, 1000 lb	
<b>Temperature compensation</b>	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 ° to 110 °C
<b>Internal amplifiers</b>	2u. Unamplified, mV/V output	
<b>Overload stops</b>	4a. Overload stops	
<b>Electrical termination</b>	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	6h. Integral cable: Silicone 6i. Integral underwater cable (max. 180 °F) 6v. Phoenix connector on end of cable 15d. Connector on end of cable
<b>Special calibration</b>	9a. 10 point (5 up/5 down) 20 % increments @ 20 °C 9b. 20 point (10 up/10 down) 10 % increments @ 20 °C	
<b>Special calibration</b>	30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression	
<b>Shock and vibration</b>	44a. Shock and vibration resistance	
<b>Interfaces<sup>4</sup></b>	53e. Signature calibration <sup>7</sup> 53t. TEDS IEEE 1451.4 module	

# Model 31 Mid

## 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 calibrated to Imperial (non-Metric) units.
7. Signature calibration only available as inline module.

## TYPICAL SYSTEM DIAGRAM



# Mid Range Precision Miniature Load Cell

**Warranty.** Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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# Honeywell

## Model 31 High

## High Range Precision Miniature Load Cell



### DESCRIPTION

Model 31 high range precision miniature load cells measure both tension and compression load forces of 2000 lb to 10000 lb. These models are our highest accuracy, rugged miniature load cells. Model 31'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 31 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.

### FEATURES

- 2000 lb to 10000 lb
- mV/V output
- Stainless steel
- Miniature design
- Stabilized column construction



# Model 31 High

## PERFORMANCE SPECIFICATIONS

Characteristic	Measure
Load ranges <sup>5</sup>	2000 lb to 10000 lb
Linearity	±0.2 % full scale
Hysteresis	±0.2 % full scale
Non-repeatability	±0.05 % full scale
Tolerance on output	2 mV/V
Operation	Tension/compression <sup>3</sup>
Resolution	Infinite

## ENVIRONMENTAL SPECIFICATIONS

Characteristic	Measure
Temperature, operating	-53 °C to 121 °C [-65 °F to 250 °F]
Temperature, compensated	15 °C to 71 °C [60 °F to 160 °F]
Storage temperature	-73 °C to 148 °C [-100 °F to 300 °F]
Temperature effect, zero	0.005 % full scale/°F
Temperature effect, span	0.005 % full scale/°F

## ELECTRICAL SPECIFICATIONS

Characteristic	Measure
Strain gage type	Bonded foil
Excitation (calibration)	5 Vdc
Insulation resistance	5000 Mohm @ 50 Vdc
Bridge resistance	350 ohm
Zero balance	1 % max.
Electrical termination (std)	Teflon cable (1524 mm [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

## WIRING CODES

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

## RANGE CODES

Range codes	Range
DL	2000 lb
DN	3000 lb
DP	4000 lb
DR	5000 lb
DT	7500 lb
DV	10000 lb

## DEFLECTIONS AND RINGING FREQUENCIES

Capacity (lb)	Deflection at full scale	Ringling frequency	Weight
2000 lb, 3000 lb	0.03 mm [0.001 in]	26000 Hz	60 g
4000 lb, 5000 lb	0.04 mm [0.0015 in]	21000 Hz	125 g
7500 lb, 10000 lb	0.04 mm [0.0015 in]	17000 Hz	250 g

## High Range Precision Miniature Load Cell

### MOUNTING DIMENSIONS

Ranges (lb)	T	ØD	C	H
2000 lb, 3000 lb	3/8-24 UNF	25,4 mm [1.00 in]	12,7 mm [0.50 in]	18,29 mm [0.72 in]
4000 lb, 5000 lb	1/2-20 UNF	31,75 mm [1.25 in]	16 mm [0.63 in]	23,88 mm [0.94 in]
7500 lb, 10000 lb	3/4-16 UNF	35,05 mm [1.38 in]	22,35 mm [0.88 in]	27,94 mm [1.10 in]



### OPTION CODES

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<b>Load range</b>	2000 lb, 3000 lb, 4000 lb, 5000 lb, 7500 lb, 10000 lb	
<b>Temperature compensation</b>	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 ° to 110 °C
<b>Internal amplifiers</b>	2u. Unamplified, mV/V output	
<b>Electrical termination</b>	6e. Integral cable: Teflon 6d. Microtec DR-4S-4H 4 pin 6f. Integral cable: PVC 6g. Integral cable: Neoprene (max. 180 °F)	6h. Integral cable: Silicone 6i. Integral underwater cable (max. 180 °F) 6v. Phoenix connector on end of cable
<b>Bridge resistance</b>	12a. 1000 ohm (foil) 12b. 5000 ohm (foil)	
<b>Electrical connector orientation</b>	15a. Horizontal electrical exit port orientation 15b. Vertical electrical exit port orientation 15c. Radial electrical exit port orientation 15d. Connector on end of cable	
<b>Special calibration</b>	30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression 30d. Tension and compression calibration, positive in compression	
<b>Shock and vibration</b>	44a. Shock and vibration resistance	
<b>Interfaces</b>	53e. Signature calibration <sup>6</sup> 53t. TEDS IEEE 1451.4 module <sup>4</sup>	

# Model 31 High

# High Range Precision Miniature Load Cell

## 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. This unit calibrated to Imperial (non-Metric) units.
6. Signature calibration only available as inline module.

## TYPICAL SYSTEM DIAGRAM



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# Honeywell

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«JONHON» (основан в 1970 г.)

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(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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