

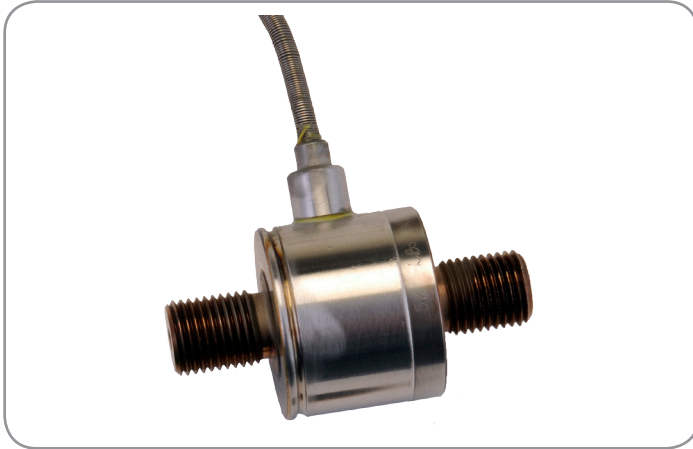
## High Range Precision Miniature Load Cells

Model 31 High

008631

Issue 2

Datasheet



### DESCRIPTION

The Model 31 is a high range, precision miniature load cell to measure both tension and compression load forces of 10 kN to 50 kN / 2000 lb to 10000 lb.

The Model 31 is Honeywell's most accurate and durable miniature load cell with a high accuracy of 0.2 % full scale as standard.

Welded, stainless steel construction is designed to eliminate or minimize the effects of off-axis loads. Each bonded strain gage unit is built of welded 17-4 PH stainless steel for additional durability and internal construction assures enhanced long-term stability.

A submersible cable option gives potential use in underwater applications.

### VALUE TO CUSTOMERS

- Enhanced accuracy of 0.2 %
- Newton and pound force ranges available

### FEATURES

- 10 kN to 50 kN / 2000 lb to 10000 lb
- mV/V output
- Stainless steel
- Miniature design
- Stabilized column construction

### POTENTIAL APPLICATIONS

- Cable tension
- Industrial process control
- Medical control systems
- Medical equipment testing
- Pharmaceutical process or product control
- Semiconductor/electronics testing
- Aerospace testing

### PORTFOLIO

Honeywell's miniature and subminiature load cells are designed to fit into systems and applications with limited space or tight clearances. Constructed of rugged stainless steel for precise measurements and enhanced long term stability and reliability under harsh operating conditions, these load cells are designed to eliminate or minimize the effect of off-axis loads. To view the entire product portfolio, click [here](#).

# High Range Precision Miniature Load Cells, Model 31 High

**Table 1. Performance Specifications**

Characteristic	Measure
Load ranges	10 kN, 20 kN, 50 kN 2000 lb, 5000 lb, 10000 lb
Linearity	±0.2 % full scale
Hysteresis	±0.2 % full scale
Non-repeatability	±0.05 % full scale
Full scale output (tolerance)	2 mV/V (nominal)
Operation	Tension/compression <sup>3</sup>
Resolution	Infinite

**Table 2. Environmental Specifications**

Characteristic	Measure
Temperature, operating	-55 °C to 125 °C [-67 °F to 257 °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	±0.01 % full scale/°C [±0.005 % full scale/°F]*
Temperature effect, span	±0.01 % reading/°C [±0.005 % reading/°F]*

\*Fahrenheit reference value.

**Table 3. Electrical Specifications**

Characteristic	Measure
Strain gage type	Bonded foil
Excitation (calibration)	10 Vdc
Insulation resistance	5000 Mohm @ 50 Vdc
Bridge resistance	350 ohm
Zero balance	±1 % full scale max.
Electrical termination (std)	Teflon® cable (1,5 m [5 ft])

**Table 4. 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

**Table 5. Wiring Codes**

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

**Table 6. Range Codes**

Range Codes	Range	Range Codes	Range
DL	2000 lb	MR	10 kN
DR	5000 lb	MS	20 kN
DV	10000 lb	MT	50 kN

**Table 7. Deflections and Ringing Frequencies**

Capacity	Deflection at full scale	Ringing frequency	Weight
10 kN, 2000 lb	0,03 mm [0.001 in]	26 KHz	60 g
20 kN, 5000 lb	0,04 mm [0.0015 in]	21 KHz	125 g
50 kN, 10000 lb	0,04 mm [0.0015 in]	17 KHz	250 g

**Table 8. Option Codes**

	<b>Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please click <a href="#">here</a> for updated listings.</b>
<b>Load range</b>	10 kN, 20 kN, 50 kN, 2000 lb, 5000 lb, 10000 lb
<b>Temperature compensation</b>	1a. 15 °C to 71 °C [60 °F to 160 °F] 1c. -18 °C to 85 °C [0 °F to 185 °F] 1h. 21 °C to 204 °C [70 °F to 400 °F] <sup>4</sup>
<b>Internal amplifiers</b>	2u. Unamplified, mV/V output
<b>Electrical termination</b>	6e. Integral cable: Teflon® 6i. Integral underwater cable 3 m [10 ft] (82 °C [180 °F] max.)
<b>Additional point calibration</b>	9a. 10 point (5 up/5 down) 20 % increment at 20 °C
<b>Electrical connector orientation</b>	15c. Radial electrical exit port orientation
<b>Special calibration</b>	30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30d. Tension and compression calibration, positive in compression
<b>Mounting interfaces<sup>7</sup></b>	(none) UN thread 32f. M10 x 1,5 32g. M12 x 1,5 32i. M20 x 1,5
<b>Electrical Interfaces<sup>5</sup></b>	53s. Phoenix connector with Signature Calibration-module 53t. TEDS IEEE 1451.4 module <sup>5</sup>

# High Range Precision Miniature Load Cells, Model 31 High

Figure 1. Mounting Dimensions

Ranges (lb)	Thread	ØD	C	H	F
2000 lb	3/8-24 UNF	25,4 mm [1.00 in]	12,7 mm [0.50 in]	19,1 mm [0.75 in]	0,3 mm [0.01 in]
10 kN	M10 x 1.5				
5000 lb	1/2-20 UNF	31,8 mm [1.25 in]	15,9 mm [0.63 in]	25,4 mm [1.00 in]	0,3 mm [0.01 in]
20 kN	M12 x 1.5				
10000 lb	3/4-16 UNF	35,1 mm [1.38 in]	22,2 mm [0.87 in]	28,7 mm [1.13 in]	0,8 mm [0.03 in]
50 kN	M20 x 1.5				

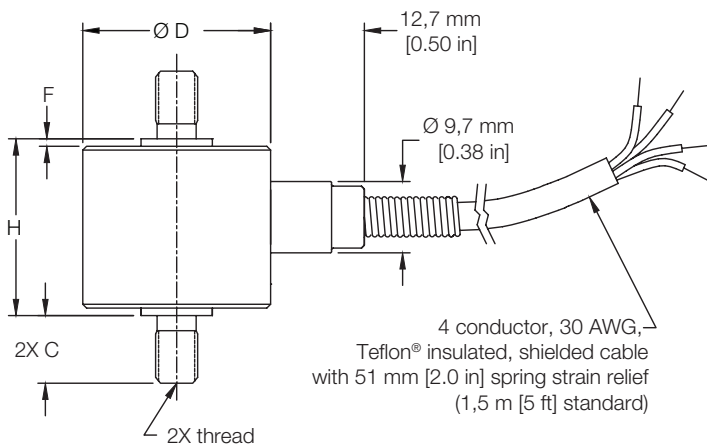


Figure 2. Typical System Diagram

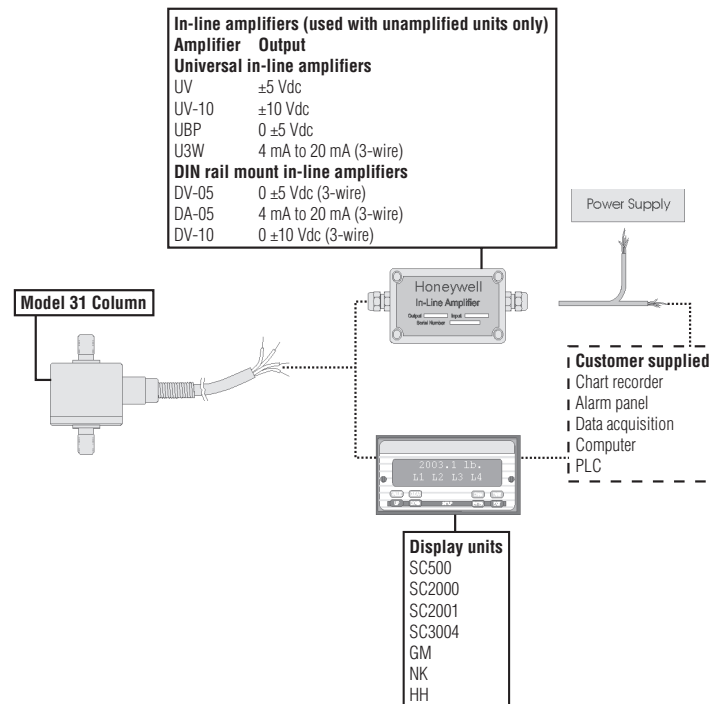


Figure 3. Product Nomenclature

	AL311	MR	1A	2U	6E		15C		32F	
	Load Type	Range	Temperature Compensation	Internal Amplifiers	Electrical Termination	Additional Point Calibration	Electrical Conn. Orientation	Special Calibration <sup>3</sup>	Mounting Threads <sup>7</sup>	Calibration Memory <sup>6</sup>
<b>Model 31 High</b> Precision Miniature Load Cell	<b>MR</b>	10 kN	<b>1A</b> 15 °C to 71 °C [60 °F to 160 °F]	<b>2U</b> Unamplified, mV/V output	<b>6E</b> Teflon®, Integral cable	Standard 5-point calibration (None)	<b>15C</b> Radial exit	Tension (+) only (none)	UN thread (none)	No storage (none)
	<b>MS</b>	20 kN	<b>1C</b> -18 °C to 85 °C [0 °F to 185 °F]		<b>6I</b> Integral under-water cable, 3 m [10 ft]			<b>9A</b> 10-point calibration		Compression only (+)
	<b>MT</b>	50 kN	<b>1H</b> 21 °C to 204 °C [70 °F to 400 °F]			Tension (+) and Compression (-)	<b>32G</b> M12 x 1.5	<b>53T</b> TEDS/IEEE 1451.4 module		
	<b>DL</b>	2000 lb				Tension (-) and Compression (+)	<b>32I</b> M20 x 1.5			
	<b>DR</b>	5000 lb								
	<b>DV</b>	10000 lb								

## 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. Consult factory for extended operation above 125°C [257 °F]
5. TEDS IEEE 1451.4 module installed at end of cable
6. Maximum operating temperature for options 53s and 53t is 85 °C [185 °F]
7. See Figure 1 to match mounting interface option with range code.

### Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell's test and measurement products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.tm@honeywell.com**

### Honeywell Safety and Productivity Solutions

9680 Old Bailes Road  
Fort Mill, SC 29707  
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**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- 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.**

### Warranty/Remedy

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 other 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.

# Honeywell