# Economical Load Cell

Model 53

***008638***

*Issue 5*

**Datasheet**

## DESCRIPTION

The Model 53 load cells are bonded foil strain gage transducers designed for cost efficient production and testing applications (i.e. press calibration). With engineered compression force measurements up to 200 kN / 50k lb, this model achieves a maximum non-linearity of 0.5 % full scale.

Precision gaging techniques and a stainless steel construction provide excellent enhanced stability and reliability under severe operating conditions. This compression-only load cell has an integral load button machined as a key part of the design.

Installation in application is fixed by three tapped holes to provide secure mounting.

## VALUE TO CUSTOMERS

- Reliable accuracy of 0.5 %
- Newton and pound force ranges available

## FEATURES

- 20 N to 200 kN / 5 lb to 50K lb
- Stainless steel
- Mini footprint
- Button-style design
- mV/V output

## POTENTIAL APPLICATIONS

- Press applications
- Weighing
- Sensing for applied load
- Automation process control

## PORTFOLIO

From general purpose load cells to fatigue-rated, high performance products, Honeywell offers a comprehensive selection of tension, compression, and universal measurement load cell. Each of our load cells can be customized to meet your needs, whatever your application. To view the entire product portfolio, click here.

# Economical Load Cell, Model 53

**Table 1. Performance Specifications**

| Characteristic | Measure |
|---|---|
| Load ranges | 5 lb, 10 lb, 25 lb, 50 lb, 100 lb, 250 lb, 500 lb, 1K lb, 2K lb, 5K lb, 10K lb, 15K lb, 20K lb, 30K lb, 50K lb<br>20 N, 50 N, 100 N, 200 N, 500 N, 1 kN, 2 kN, 5 kN, 10 kN, 20 kN, 50 kN, 100 kN, 150 kN, 200 kN |
| Linearity (max.) | ±0.5 % full scale |
| Hysteresis (max.) | ±0.3 % full scale |
| Non-repeatability (max.) | ±0.1 % full scale |
| Output (tolerance) | 2 mV/V (nominal) |
| Operation | Compression |
| Resolution | Infinite |

**Table 2. 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] |
| Temperature effect, zero | ±0.01 % full scale/°C<br>[±0.005 % full scale/°F] |
| Temperature effect, span | ±0.02 % reading/°C<br>[±0.01 % reading/°F] |

**Table 3. Electrical Specifications**

| Characteristic | Measure |
|---|---|
| Strain gage type | Bonded foil |
| Excitation (calibration)<br>20 N to 500 N, 5 lb to 100 lb | 5 Vdc |
| Excitation (calibration)<br>1000 N to 200 kN,<br>250 lb to 50K lb | 10 Vdc |
| Insulation resistance | 5000 Mohm @ 50 Vdc |
| Bridge resistance (tolerance) | 350 ohm |
| Zero balance | ±3 % full scale |
| Shunt calibration data | Included |
| Electrical termination (std) | Teflon® cable (1,5 m [5 ft]) |

**Table 4. Mechanical Specifications**

| Characteristic | Measure |
|---|---|
| Maximum allowable load | 150 %FS[1] |
| Weight | see table |
| Material | 17-4 PH stainless steel |
| Deflection full scale | see table |
| Natural frequency | see table |

**Table 5. Wiring Codes**

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

**Table 6. Range Codes**

| Range Codes | Range | Range Codes | Range |
|---|---|---|---|
| **AT** | 5 lb | **MI** | 20 N |
| **AV** | 10 lb | **MK** | 50 N |
| **BL** | 25 lb | **ML** | 100 N |
| **BN** | 50 lb | **MM** | 200 N |
| **BR** | 100 lb | **MY** | 500 N |
| **CN** | 250 lb | **MN** | 1 kN |
| **CR** | 500 lb | **MO** | 2 kN |
| **CV** | 1K lb | **MQ** | 5 kN |
| **DL** | 2K lb | **MR** | 10 kN |
| **DR** | 5K lb | **MS** | 20 kN |
| **DV** | 10K lb | **MT** | 50 kN |
| **EJ** | 15K lb | **MU** | 100 kN |
| **EL** | 20K lb | **ZB** | 150 kN |
| **EN** | 30K lb | **MV** | 200 kN |
| **EP** | 50K lb | | |

**Table 8. Deflections and Ringing Frequencies**

| Capacity | Deflection @ full scale | Natural ringing frequency | Weight with cable g [lb] |
|---|---|---|---|
| 5 lb/20 N | 0,03 mm [0.001 in] | 2 KHz | 59 [0.13] |
| 10 lb/50 N | 0,03 mm [0.001 in] | 3 KHz | 59 [0.13] |
| 25 lb/100 N | 0,03 mm [0.001 in] | 16 KHz | 62 [0.136] |
| 50 lb/200 N | 0,03 mm [0.001 in] | 21 KHz | 63 [0.138] |
| 100 lb/500 N | 0,03 mm [0.001 in] | 28 KHz | 64 [0.141] |
| 250 lb/1 kN | 0,03 mm [0.001 in] | 25 KHz | 72 [0.158] |
| 500 lb 2 kN | 0,03 mm [0.001 in] | 32 KHz | 72 [0.158] |
| 1000 lb/5 kN | 0,03 mm [0.001 in] | 42 KHz | 75 [0.165] |
| 2000 lb/10 kN | 0,03 mm [0.001 in] | 53 KHz | 77 [0.17] |
| 5000 lb/20 kN | 0,03 mm [0.001 in] | 34 KHz | 140 [0.306] |
| 10K lb/50 kN | 0,03 mm [0.001 in] | 47 KHz | 145 [0.32] |
| 15K lb | 0,05 mm [0.002 in] | 24 KHz | 368 [0.811] |
| 20K lb/100 kN | 0,05 mm [0.002 in] | 28 KHz | 372 [0.820] |
| 30K lb/150 kN | 0,05 mm [0.002 in] | 33 KHz | 377 [0.831] |
| 50K lb/200 kN | 0,08 mm [0.003 in] | 24 KHz | 1270 [2.8] |

# Economical Load Cell, Model 53

**Figure 1. Mounting Dimensions: Model 53 (lb)**

| Ranges lb | ØD1 mm [in] | ØD2 mm [in] | | H mm [in] | | L mm [in] | | A | B mm [in] | ØG mm [in] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | (6E) | (6I) | (6E) | (6I) | (6E) | (6I) | | | |
| 5 lb to 100 lb | 25,4 [1.00] | 5,80 [0.23] | | 15,7 [0.62] | | 1,3 [0.05] | | #4-40 UNC | 5,6 [0.22] | 19,05 [0.750] |
| 250 lb to 2K lb | 31,8 [1.25] | 8,1 [0.32] | 7,1 [0.28] | 9,9 [0.39] | 17,8 [0.70] | 1,8 [0.07] | 1,3 [0.05] | #6-32 UNC | 5,1 [0.20] | 25,4 [1.000] |
| 3K lb to 10K lb | 38,1 [1.50] | 10,2 [0.40] | | 16,0 [0.63] | | 2,2 [0.09] | | #6-32 UNC | 5,1 [0.20] | 31,75 [1.250] |
| 15K lb to 30K lb | 50,8 [2.00] | 15,2 [0.60] | | 25,4 [1.00] | | 3,0 [0.12] | | #6-32 UNC | 6,4 [0.25] | 41,28 [1.625] |
| 50K lb | 76,2 [3.00] | 19,8 [0.78] | | 38,1 [1.5] | | 4,6 [0.18] | | #6-32 UNC | 6,4 [0.25] | 60,33 [2.375] |

**Figure 2. Mounting Dimensions: Model 53 (N)**

| Ranges N | ØD1 mm [in] | ØD2 mm [in] | | H mm [in] | | L mm [in] | | A | B mm [in] | ØG mm [in] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | (6E) | (6I) | (6E) | (6I) | (6E) | (6I) | | | |
| 20 N to 500 N | 25,4 [1.00] | 5,80 [0.23] | | 15,7 [0.62] | | 1,3 [0.05] | | M3 x 0,5 | 5,6 [0.22] | 19,05 [0.750] |
| 1 kN to 10 kN | 31,8 [1.25] | 8,1 [0.32] | 7,1 [0.28] | 9,9 [0.39] | 17,8 [0.70] | 1,8 [0.07] | 1,3 [0.05] | M4 x 0,7 | 5,1 [0.20] | 25,4 [1.000] |
| 20 kN to 50 kN | 38,1 [1.50] | 10,2 [0.40] | | 16,0 [0.63] | | 2,2 [0.09] | | M4 x 0,7 | 6,0 [0.24] | 32 [1.260] |
| 100 kN to 150 kN | 50,8 [2.00] | 15,2 [0.60] | | 25,4 [1.00] | | 3,0 [0.12] | | M4 x 0,7 | 6,0 [0.24] | 41,28 [1.625] |
| 200 kN | 76,2 [3.00] | 19,8 [0.78] | | 38,1 [1.5] | | 4,6 [0.18] | | M4 x 0,7 | 6,0 [0.24] | 60,00 [2.362] |

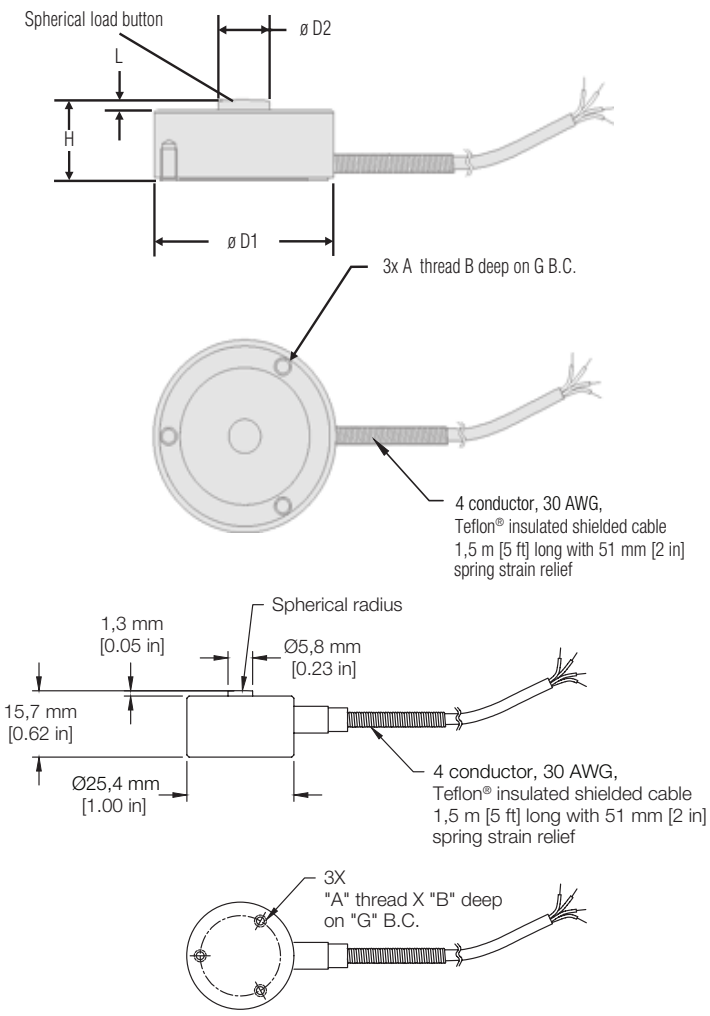


**Table 9. Option Codes**

| | **Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please see http://sensing.honeywell.com/TMsensor-ship for updated listings.** |
|---|---|
| **Load range** | 5 lb, 10 lb, 25 lb, 50 lb, 100 lb, 250 lb, 500 lb, 1K lb, 2K lb, 5K lb, 10K lb, 15K lb, 20K lb, 30K lb, 50K lb<br>20 N, 50 N, 100 N, 200 N, 500 N, 1 kN, 2 kN, 5 kN, 10 kN, 20 kN, 50 kN, 100 kN, 150 kN, 200 kN |
| **Temperature compensation** | 1a. 15° C to 71 °C [60 °F to 160 °F] |
| **Internal amplifiers** | 2u. Unamplified, mV/V output |
| **Electrical termination** | 6e. Integral cable: Teflon®<br>6i. Integral underwater cable (max. 82 °C [180 °F]) |
| **Additional point calibration** | 9a. 10 point (5 up/5 down) 20 % increments @ 20 °C [68 °F] |
| **Electrical interfaces[4]** | 53s. Phoenix connector and signature calibration module on end of cable<br>53t. TEDS IEEE 1451.4 module[3] |

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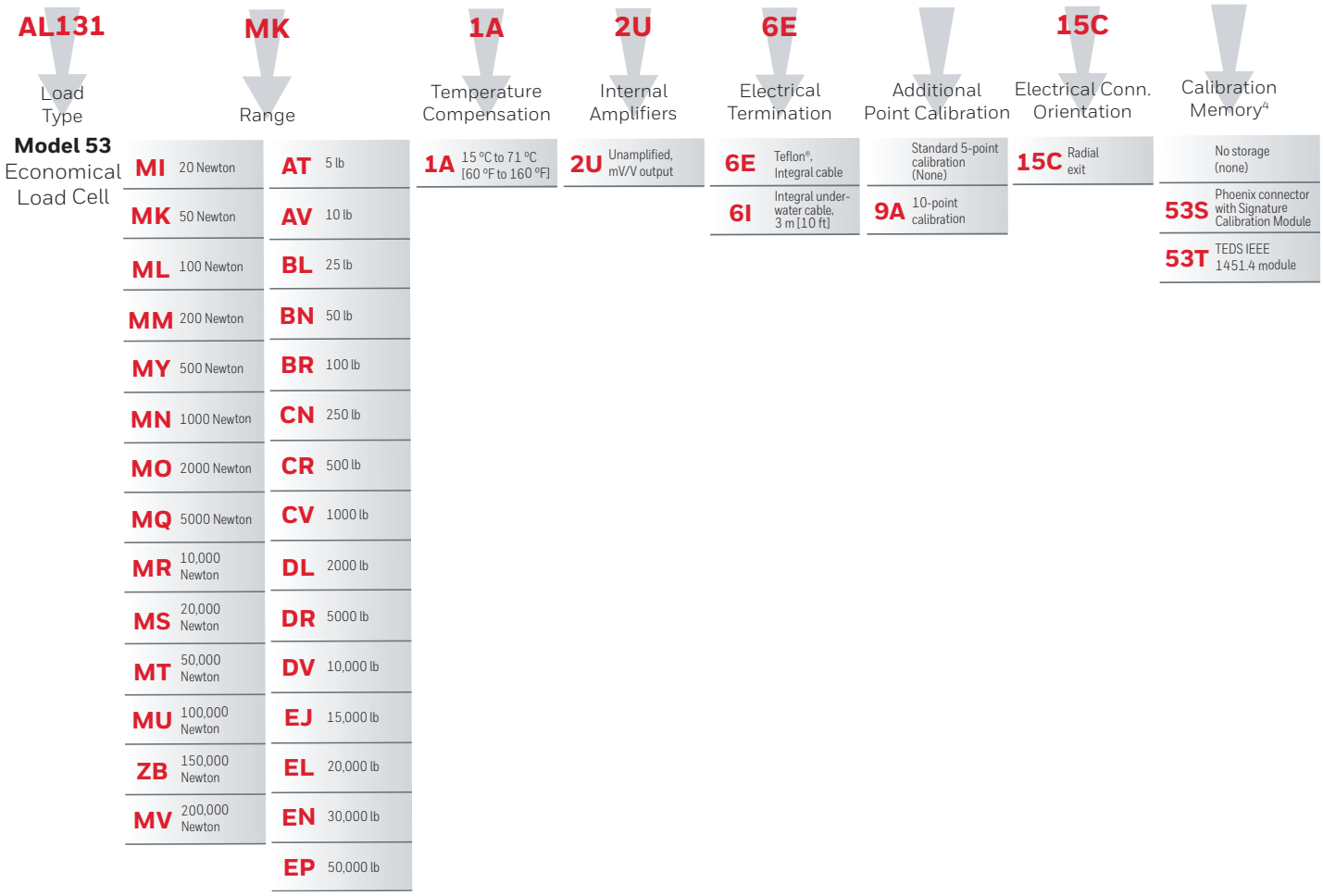
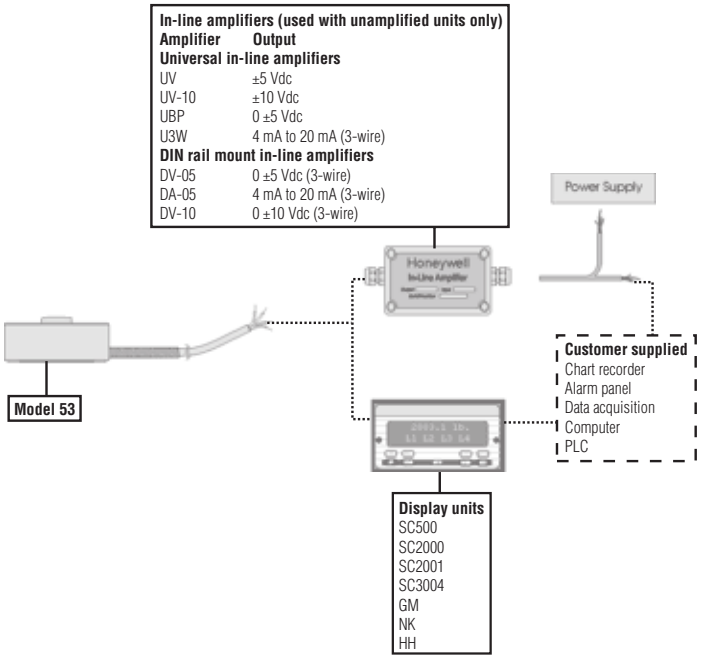
**Figure 3. Product Nomenclature**



## NOTES

1. Allowable maximum loads – maximum load to be applied without damage.[2]
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. TEDS IEEE 1454.4 module installed at end of cable.
4. Maximum operating temperature for options 53S and 53T is 85 °C [185 °F]

**Figure 4. Typical System Diagram**

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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.**

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