

Model 41

Precision Low Profile Load Cell



DESCRIPTION

Model 41 is a low profile “pancake” type load cells. These bonded foil, strain gage load cells are engineered to measure loads from 5 lb to 500,000 lb. The tension/ compression Model 41 is designed with the threaded hole running completely through the center of the cell. Model 41 utilizes two stabilizing diaphragms, which are welded to the sensing member to

reduce off-center and side-loading effects. It provides high performance in non-linearity, hysteresis, and repeatability specifications for such applications as tube mills, extruding processes and weighing. Each unit has a welded construction and can be hermetically sealed for added durability. Model 41 load cells are available with optional 0 Vdc to 5 Vdc or 4 mA to 20 mA output.



FEATURES

- 0.1 % accuracy
- 5 lb to 500000 lb
- mV/V output (standard); 4 mA to 20 mA and 0 Vdc to 5 Vdc (optional) outputs
- Double diaphragm design
- Intrinsically safe available (2N option only)¹⁶
- CE approved¹⁷

Model 41

PERFORMANCE SPECIFICATIONS

| Characteristic | Measure |
|--|--|
| Load ranges ¹⁸ | 5 lb to 500000 lb |
| Non-linearity, 5 lb to 25 lb | ±0.2 % full scale |
| Non-linearity, 50 lb to 500000 lb | ±0.1 % full scale |
| Hysteresis, 5 lb to 25 lb | ±0.1 % full scale |
| Hysteresis, 50 lb to 500000 lb | ±0.08 % full scale |
| Non-repeatability, 5 to 25 lb | ±0.1 % full scale |
| Non-repeatability, 50 lb to 500000 lb | ±0.03 % full scale |
| Output (tolerance), 5 lb to 25 lb | 2 mV/V ±0.5 % full scale |
| Output (tolerance), 50 lb to 500000 lb | 3 mV/V ±0.5 % full scale |
| Operation | Compression/tension ¹³ |
| Resolution | Infinite |
| Standard calibration | 5-point calibration: 0 %, 50 % and 100 % of full scale in tension only |

ENVIRONMENTAL SPECIFICATIONS

| Characteristic | Measure |
|--------------------------|-------------------------------------|
| Temperature, operating | -54 °C to 121 °C [-65 °F to 250 °F] |
| Temperature, compensated | 15 °C to 71 °C [60 °F to 160 °F] |
| Temperature effect, zero | 0.002 % full scale/°F |
| Temperature effect, span | 0.002 % full scale/°F |

ELECTRICAL SPECIFICATIONS

| Characteristic | Measure |
|---|-------------------------------|
| Strain gage type | Bonded foil |
| Excitation (calibration) | 10 Vdc |
| Insulation resistance | 5000 mOhm @ 50 Vdc |
| Bridge resistance (tolerance) | 350 ohm (nominal) |
| Zero balance (tolerance) | ±1 % full scale |
| Shunt calibration data | Included |
| Electrical termination (std) 5 lb to 5000 lb | PTIH-10-6P |
| Electrical termination (std) 7500 lb to 500000 lb | MS3102E-14S-6P |
| Mating connector 5 lb to 5000 lb (not incl.) | PT06A-10-6S or equiv. (AA111) |
| Mating connector 7500 to 500000 lb (not incl.) | MS3106A-14S-6S (AA121) |

MECHANICAL SPECIFICATIONS

| Characteristic | Measure |
|---|------------------------|
| Maximum allowable load | 150 % FS ¹ |
| Weight | See table |
| Material Less than 200,000 lb | 17-4PH stainless steel |
| Material greater than or equal to 300000 lb | Carbon steel |
| Deflection | See table |
| Natural frequency | See table |

RANGE CODES

| Range Code | Available ranges | Range Code | Available ranges |
|------------|------------------|------------|------------------|
| AT | 5 lb | DV | 10000 lb |
| AV | 10 lb | EJ | 15000 lb |
| BL | 25 lb | EL | 20000 lb |
| BN | 50 lb | EN | 30000 lb |
| BR | 100 lb | EP | 50000 lb |
| CN | 250 lb | ER | 75000 lb |
| CR | 500 lb | ET | 100000 lb |
| CV | 1000 lb | FJ | 150000 lb |
| DL | 2000 lb | FL | 200000 lb |
| DN | 3000 lb | FN | 300000 lb |
| DP | 4000 lb | FP | 400000 lb |
| DR | 5000 lb | FR | 500000 lb |
| DT | 7500 lb | | |

WIRING CODES

| Connector | Unamplified (Std.) |
|-----------|--------------------|
| A | (+) excitation |
| B | (+) excitation |
| C | (-) excitation |
| D | (-) excitation |
| E | (-) output |
| F | (+) output |

DEFLECTIONS AND RINGING FREQUENCIES

| Capacity (lb) | Deflection @ full scale (in) | Natural ringing frequency (Hz) | Weight (lb) |
|------------------|------------------------------|--------------------------------|-------------|
| 5 to 25 | 0.001 | 2000 | 0.8 |
| 50 to 1000 | 0.002 | 4600 | 1.5 |
| 2000 to 5000 | 0.002 | 10000 | 2.0 |
| 7500 to 15000 | 0.003 | 6000 | 8.8 |
| 20000 to 50000 | 0.004 | 8000 | 11.0 |
| 75000 to 100000 | 0.006 | 5500 | 30.9 |
| 150000 to 200000 | 0.010 | 4500 | 46.3 |
| 300000 to 500000 | 0.010 | 4100 | 130.1 |

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INTERNAL AMPLIFIERS

| Amplifier specifications | Voltage output: Option 2b | Voltage output: Option 2c | Voltage output: Option 2t | Current three-wire: Option 2j | Current two-wire: Option 2k | Intrinsically safe amp: Option 2n (2N)*** |
|--------------------------|--|--|--|--|--|--|
| Output signal | ±5 V | 0-5 V or ±5 V @ 45 mA | 0-10 V or ±10 V @ 45 mA | 4 mA to 20 mA | 4 mA to 20 mA | 4 mA to 20 mA |
| Input power (voltage) | ±15 Vdc or 26-32 Vdc | 11 Vdc to 28 Vdc | 15 Vdc to 28 Vdc | 22 Vdc to 32 Vdc | 9 Vdc to 32 Vdc | 9 Vdc to 28 Vdc |
| Input power (current) | 45 mA | 40 mA | 40 mA | 65 mA | 4 mA to 28 mA | 4 mA to 24 mA |
| Freq. response | 3000 Hz | 3000 Hz | 3000 Hz | 2500 Hz | 300 Hz | 2000 Hz |
| Power supply rejection | 60 db | 60 db | 60 db | 60 db | 60 db | 60 db |
| Operating temperature | -20 °F to 185 °F | -20 °F to 185 °F | -20 °F to 185 °F | 0 °F to 185 °F | 0 °F to 185 °F | -20 °F to 185 °F |
| Reverse volt. protection | Yes | Yes | Yes | Yes | Yes | Yes |
| Short circuit protection | Momentary | Momentary | Momentary | Yes | Yes | Yes |
| Wiring code: connector | A (+) Supply B Output common C Supply return D (+) Output E Shunt Cal 1 F Shunt Cal 2 | A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2 | A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2 | A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2 | A (+) Supply B No connection C No connection D (+) Output E Case ground F No connection | A (+) Supply B No connection C No connection D (+) Output E Case ground F No connection |
| Wiring code: cable | R (+) Supply BI Output common G Supply return W (+) Output B Shunt Cal 1 Br Shunt Cal 2 | R (+) Supply BI Output com* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2 | R (+) Supply BI Output com* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2 | R (+) Supply BI Output com* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2 | R (+) Supply BI (+) Output W Case ground | R (+) Supply BI (+) Output W Case ground |

* Black and green wires are internally connected.

** Pins B and C are internally connected.

*** See our Web site (<http://measurementsensors.honeywell.com>) for the most up-to-date information regarding intrinsically safe approvals, ref. #008-0547-00.

ALLOWABLE MAXIMUM LOADS

| Capacity (lb) | Side load (lb) | Bending (lb-in) | Torque (lb-ft) |
|------------------|----------------|-----------------|----------------|
| 5 to 25 | 50 % | 40 % | 25 % |
| 50 to 1000 | 45 % | 35 % | 25 % |
| 2000 to 5000 | 30 % | 25 % | 25 % |
| 7500 to 30000 | 20 % | 20 % | 15 % |
| 50000 to 100000 | 20 % | 20 % | 15 % |
| 150000 to 200000 | 20 % | 20 % | 15 % |
| 300000 | 20 % | 20 % | 10 % |
| 400000 | 20 % | 20 % | 10 % |
| 500000 | 20 % | 20 % | 10 % |



Model 41

OPTION CODES

| | Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please see http://measurementsensors.honeywell.com for updated listings. | | | |
|---|--|--|--|--|
| Load ranges | 5, 10, 25, 50, 100, 250, 500, 1000, 2000, 5000, 3000, 4000, 7500, 10000, 15000, 20000, 30000, 50000, 75000, 100000, 150000, 200000, 300000, 400000, 500000 lb | | | |
| 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 ¹⁴ 1h. 70 °F to 400 °F ¹⁴ 1i. -65 °F to 250 °F ¹⁴ | 1j. 0 °C to 50 °C 1k. -20 °C to 85 °C 1m. -25 °C to 110 °C |
| Internal amplifiers¹⁰ | 2b. 4 wire, ±5 Vdc 2c. 0-5 Vdc output | 2j. 4-20 mA (three-wire) output 2k. 4 mA to 20 mA (two-wire) ²⁰ | 2n (2N) 4 mA to 20 mA (wire) intrinsically safe ²⁰ 2t. 0 Vdc to 10 Vdc | 2u. Unamplified, mV/V output |
| Internal amplifier enhancements | 3a. Input/output isolation ¹⁹ 3d. Remote buffered shunt calibration ⁸ | | | |
| Overload stops | 4a. Overload stops | | | |
| Electrical termination | 6a. Bendix PTIH-10-6P 6-pin (ranges to 5000 lb) 6b. MS3102E-14S-6P (ranges 7500 lb and up) ⁹ 6e. Integral cable: Teflon | 6f. Integral cable: PVC 6g. Integral cable: Neoprene ⁹ 6h. Integral cable: Silicone | 6i. Integral underwater cable ⁹ 6j. 1/2-14 conduit fitting with 5 ft of 4 conductor PVC cable | 6q. Molded integral cable polyurethane ⁹ 6v. Phoenix connector on end of cable |
| Shunt calibration | 8a. Precision internal resistor ¹⁴ | | | |
| Special calibration | 9a. 10 point (5 up/5 down) 20 % increments @ 68 °F 9b. 20 point (10 up/10 down) 10 % increments @ 68 °F 9c. ASTM E-74 calibration | | | |
| Bridge resistance | 12b. 5000 ohm (foil) | | | |
| Zero and span adjustment | 14a. No access to pots 14b. Top access to pots | | | |
| Electrical connector orientation | 15a. Horizontal electrical exit port orientation 15b. Vertical electrical exit port orientation | | 15c. Radial electrical exit port orientation 15d. Connector on end of cable | |
| Special calibration | 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 | | | |
| Bridge type | 31a. Dual bridge | | | |
| Shock and vibration | 44a. Shock and vibration resistance | | | |
| Interfaces | 53e. Signature calibration ¹⁴ 53t. TEDS IEEE 1451.4 module ¹⁵ | | | |

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MOUNTING DIMENSIONS

| Ranges lb | D mm [in] | H mm [in] | H*** mm [in] | F# | ØG mm [in] B.C. | ØK mm [in] thru | T | A mm [in] | A* mm [in] | B mm [in] | B* mm [in] | C mm [in] |
|-------------------------|---------------|---------------|---------------|----|-----------------|-----------------|--------------|--------------|-------------|--------------|-------------|--------------|
| 5, 10, 25 | 63,5 [2.50] | 20,32 [0.80] | 44,45 [1.75] | 6 | 50,8 [2.000] | 4,83 [0.19] | 1/4-28 UNF | 20,83 [0.82] | 63,5 [2.5] | 19,05 [0.75] | 22,86 [0.9] | 31,75 [1.25] |
| 50, 100, 250, 500, 1000 | 76,2 [3.00] | 25,4 [1.00] | 44,45 [1.75] | 6 | 57,15 [2.250] | 7,11 [0.28] | 3/8-24 UNF | 20,83 [0.82] | 63,5 [2.5] | 19,05 [0.75] | 22,86 [0.9] | 31,75 [1.25] |
| 2000, 3000, 4000, 5000 | 88,9 [3.50] | 25,4 [1.00] | 44,45 [1.75] | 6 | 66,68 [2.625] | 8,64 [0.34] | 1/2-20 UNF | 20,83 [0.82] | 63,5 [2.5] | 19,05 [0.75] | 22,86 [0.9] | 31,75 [1.25] |
| 7500, 10000, 15000 | 139,7 [5.50] | 45,7 [1.80] | 45,7 [1.80] | 8 | 114,3 [4.500] | 10,16 [0.40] | 1-14 UNS | 31,75 [1.25] | 58,42 [2.3] | 38,1 [1.50] | 38,1 [1.5] | 50,8 [2.00] |
| 20000, 30000, 50000 | 152,4 [6.00] | 45,7 [1.80] | 45,7 [1.80] | 8 | 123,83 [4.875] | 13,46 [0.53] | 1 1/2-12 UNF | 31,75 [1.25] | 58,42 [2.3] | 38,1 [1.50] | 38,1 [1.5] | 50,8 [2.00] |
| 75000, 100000 | 228,6 [9.00] | 63,5 [2.50] | 63,5 [2.50] | 12 | 196,85 [7.750] | 16,76 [0.66] | 2-12 UN | 31,75 [1.25] | 58,42 [2.3] | 38,1 [1.50] | 38,1 [1.5] | 50,8 [2.00] |
| 150000, 200000 | 279,4 [11.00] | 63,5 [2.50] | 63,5 [2.50] | 12 | 241,3 [9.500] | 19,81 [0.78] | 2 1/2-12 UN | 31,75 [1.25] | 58,42 [2.3] | 38,1 [1.50] | 38,1 [1.5] | 50,8 [2.00] |
| 300000, 400000, 500000 | 355,6 [14.00] | 107,95 [4.25] | 107,95 [4.25] | 12 | 298,45 [11.750] | 26,16 [1.03] | 3 1/2-8 UN | 31,75 [1.25] | 58,42 [2.3] | 38,1 [1.50] | 38,1 [1.5] | ** |

* Length of load cell with amplified option (see option codes)

** C dimension varies on high ranges. Consult factory

*** H dimension with 2n(2N) amplifier

F Clearance holes equally spaced on G diameter B.C.
K diameter thru



TYPICAL SYSTEM DIAGRAM



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. Interconnecting shunt cal. 1 terminal with shunt cal. 2 terminal provides 50 % (unamplified units), 75 % (4 mA to 20 mA 3-wire units) or 80 % (voltage amplified units) of full scale output for quick calibration. Shunt calibration comes standard with internal amplifier option 2b, 2c, 2t and 2j.
4. O=Orange; Y=Yellow; B=Blue; Bl=Black; R=Red; Br=Brown; W=White; G=Green. Color specifying cable and number or letter specifying connector.
5. No mating connector necessary for cable option.
6. Adding any internal amplifiers on 5 lb to 25 lb ranges will increase delivery time.
7. Option 2n (2N) on 5 to 5000 lb. ranges will typically take 12 weeks for delivery.
8. Option 3d is not available with option 2n (2N) or 2k.
9. Not available with option 1c, 1e, 1f, 1g, 1h or 1i.
10. Consult factory.
11. Availability varies with range, consult factory.
12. Option only pertinent when option 2n (2N) selected.
13. Standard calibration for tension/compression load cells is in tension only.
14. Not available with amplified output.
15. Consult factory for TEDS availability with amplified models.
16. Range dependent; consult factory. Termination dependent; consult factory.
17. Internal amp and termination dependent; consult factory.
18. This unit calibrated to Imperial (non-Metric) units.

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