

Model RF

Rod End In-line Tension Load Cell



DESCRIPTION

Model RF, with female threads, is a high output rod end load cell designed to be mounted inline to the load axis to measure tension. The outputs for these load cells are ± 5 Vdc or 10 Vdc, or 4 mA to 20 mA (two wire) all calibrated in tension. The mounting thread configurations and the all welded stainless steel construction make these tension load cells ideal for a variety of rugged field applications as well as in the laboratory.

The optional high output signal offers resistance to electrical noise as well as additional signal resolution. Additional options include an internal buffered shunt calibration circuit for ease of setup with an associated indicator, and a variety of thread selections, including metric sizes.

FEATURES

- 2000 lb to 200000 lb range
- Female/female threads
- Stainless steel, all-welded construction
- 0 Vdc to 5 Vdc or 4 mA to 20 mA outputs
- Up to 0.15 % linearity
- CE approved¹⁰

Model RF

PERFORMANCE SPECIFICATIONS

| Characteristic | Measure |
|------------------------------------|----------------------|
| Load ranges ¹² | 2000 lb to 200000 lb |
| Linearity 100 lb to 1000 lb | ±0.2 % full scale |
| Linearity 2000 lb to 50000 lb | ±0.15 % full scale |
| Linearity 75000 lb to 20000 lb | ±0.2 % full scale |
| Hysteresis 100 lb to 1000 lb | ±0.2 % full scale |
| Hysteresis 2000 lb to 50000 lb | ±0.15 % full scale |
| Hysteresis 75000 lb to 20000 lb | ±0.2 % full scale |
| Non-repeatability | ± 0.05 % full scale |
| Output | 2 mV/V |
| Operation | Tension |
| Resolution | Infinite |

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 | 0.005 % full scale/°F |
| Temperature effect, span | 0.005 % full scale/°F |

ELECTRICAL SPECIFICATIONS

| Characteristic | Measure |
|--|---|
| Strain gage type | Bonded foil |
| Excitation (calibration) | 10 Vdc |
| Excitation (acceptable) | Up to 15 Vdc or Vac |
| Insulation resistance | 5000 mOhm @ 50 Vdc |
| Bridge resistance (tolerance) | 350 ohm |
| Zero balance (tolerance) | ±1% full scale |
| Shunt calibration data | Included |
| Electrical termination (std) 2000 lb to 50000 lb | PTIH-10-6P or equivalent (hermetic stainless) |
| Electrical termination (std) 75000 lb to 200000 lb | MS3102E-14S-6P or equivalent |
| Mating connector (not included) 2000 lb to 50000 lb | PT06A-10-6S or equivalent (AA111) |
| Mating connector (not included) 75000 lb to 200000 lb | MS3106A-14S-6S or equivalent (AA121) |

MECHANICAL SPECIFICATIONS

| Characteristic | Measure |
|------------------------|-----------------------|
| Maximum allowable load | 150 % FS ¹ |
| Weight | See table |
| Material | Stainless steel |
| Deflection full scale | See table |
| Natural frequency | See table |

RANGE CODES

| Range Code | Available ranges | Range Code | Available ranges |
|------------|------------------|------------|------------------|
| DL | 2000 lb | EL | 20000 lb |
| DN | 3000 lb | EN | 30000 lb |
| DP | 4000 lb | EP | 50000 lb |
| DR | 5000 lb | ER | 75000 lb |
| DT | 75000 lb | ET | 100000 lb |
| DV | 10000 lb | FJ | 150000 lb |
| EJ | 15000 lb | FL | 200000 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 at full scale mm [in] | Ringling frequency (Hz) | Weight kg [lb] |
|------------------|----------------------------------|-------------------------|----------------|
| 2000 | 0,076 [0.003] | 5000 | 0,58 [1.3] |
| 3000 | 0,076 [0.003] | 5000 | 0,58 [1.3] |
| 4000 | 0,076 [0.003] | 5100 | 0,58 [1.3] |
| 5000 | 0,076 [0.003] | 5200 | 0,58 [1.3] |
| 7500 | 0,076 [0.003] | 8000 | 0,72 [1.6] |
| 10000 | 0,076 [0.003] | 8500 | 0,72 [1.6] |
| 15000 | 0,076 [0.003] | 9000 | 0,72 [1.6] |
| 20000 | 0,102 [0.004] | 9000 | 0,77 [1.7] |
| 30000 | 0,102 [0.004] | 8000 | 1,58 [3.5] |
| 50000 | 0,127 [0.005] | 8000 | 1,67 [3.7] |
| 75000 to 100000 | 0,152 [0.006] | 3500 | 18,00 [39.7] |
| 150000 to 200000 | 0,178 [0.007] | 3000 | 33,02 [72.8] |

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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 V to 5 V or ±5 V @ 45 mA | 0 V to 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 V or 26 Vdc to 32 Vdc | 11 Vdc to 28 Vdc | 15 Vdc to 28 Vdc | 22 Vdc to 32 Vdc | 15 Vdc to 40 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. resp (amp) | 3000 Hz | 3000 Hz | 3000 Hz | 2500 Hz | 300 Hz | 2000 Hz |
| Power supply rej. | 60 db | 60 db | 60 db | 60 db | 60 db | 60 db |
| Operating temp. | -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 voltage protection | Yes | Yes | Yes | Yes | Yes | Yes |
| Short cir. protection | Momentary | Momentary | Momentary | Yes | Yes | Yes |
| Wiring code: connector (std)⁵ | 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^{5,6,7} | R (+) Supply Bl Output common G Supply return W (+) Output B Shunt cal 1 Br Shunt cal 2 | R (+) Supply Bl Output common* G Supply return* W (+) Output B Shunt cal 1 Br Shunt cal 2 | R (+) Supply Bl Output common* G Supply return* W (+) Output B Shunt cal 1 Br Shunt cal 2 | R (+) Supply Bl Output common* G Supply return* W (+) Output B Shunt cal 1 Br Shunt cal 2 | R (+) Supply Bl (+) Output W Case ground | R (+) Supply Bl (+) Output W Case ground |

* Black and green wires are internally connected.

** Pins B and C are internally connected.

*** See our Web site for the most up-to-date information regarding intrinsically safe approvals, ref. #008-0547-00.

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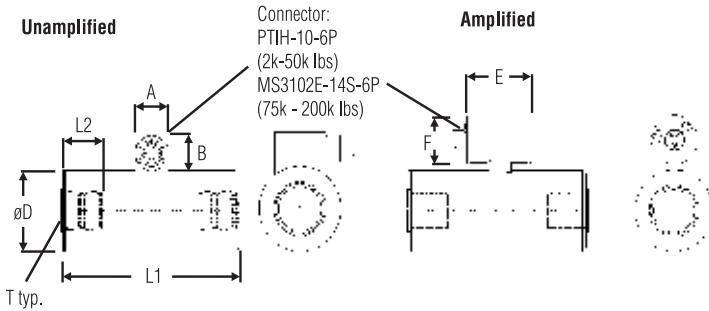
OPTION CODES

| | 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 ranges | 2K, 3K, 4K, 5K, 7.5K, 10K, 15K, 20K, 30K, 50K, 75K, 100K, 150K, 200K | |
| 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 ⁸ 1h. 70 °F to 400 °F ⁸ 1i. -65 °F to 250 °F ⁸ 1j. 0 °C to 50 °C 1k. -20 °C to 85 °C 1m. -25 °C to 110 °C |
| Internal amplifiers | 2b. 4 wire, ±5 Vdc output 2c. 0 Vdc to 5 Vdc 2j. 4 mA to 20 mA (three-wire) output 2k. 4 mA to 20 mA (two-wire) ¹² | 2n (2N) 4 mA to 20 mA (two-wire) intrinsically safe ¹² 2t. 0 Vdc to 10 Vdc output 2u. Unamplified, mV/V output |
| Internal amp enhancements | 3a. Input/output isolation ⁷ 3d. Remote buffered shunt calibration | |
| Electrical termination | 6a. Bendix PTIH-10-6P (or equivalent) 6-pin, (max. 250 °F) (ranges 50000 lb and below) 6b. MS connector MS3102E-14S-6P (mates with MS3106E-14S-6), (max. 160 °F) (ranges above 50000 lb) ⁶ 6e. Integral cable: Teflon 6f. Integral cable: PVC | 6g. Integral cable: Neoprene 6h. Integral cable: Silicone 6i. Integral underwater cable 6j. 1/2-14 conduit fitting with 5 ft of 4 conductor PVC cable 6q. Integral cable: Polyurethane 6v. Phoenix connector on end of cable |
| Shunt calibration | 8a. Precision internal resistor ⁸ | |
| Bridge type | 11a. Square bridge ⁸ 11b. Symmetrical bridge ⁸ 11c. Square and symmetrical bridge ⁸ 31a. Dual bridge | |
| Bridge resistance | 12b. 5000 ohm (foil) (max. 250 °F) | |
| Zero and span adjustment | 14a. No access to zero and span adjustment | |
| 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 | |
| Shock and vibration | 44a. Shock and vibration resistance | |
| Interfaces | 53e. Signature calibration ⁸ 53t. TEDS IEEE 1451.4 module ⁹ | |

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MOUNTING DIMENSIONS

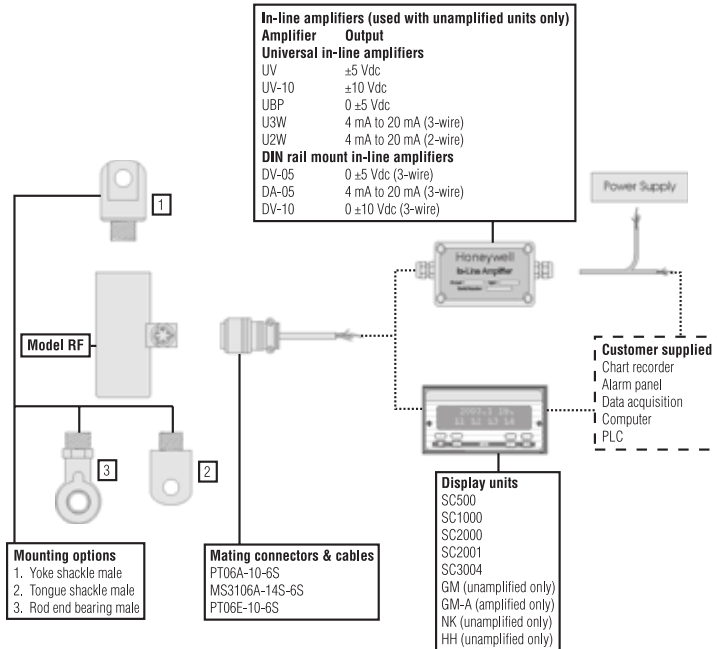
| Order code (Unamp/Amp) | D mm [in] | L1 mm [in] | Unamplified only | | Amplified only | | |
|---------------------------|--------------|---------------|------------------|--------------|----------------|--------------|-------------|
| | | | A mm [in] | B mm [in] | L2 mm [in] | E mm [in] | F mm [in] |
| AL414/AL614 | 38,1 [1.50] | 107,95 [4.25] | 19,05 [0.75] | 20,82 [0.82] | see below | 49,53 [1.95] | 38,1 [1.50] |
| AL416/AL616 | 44,45 [1.75] | 127 [5.00] | 19,05 [0.75] | 20,82 [0.82] | see below | 49,53 [1.95] | 38,1 [1.50] |
| AL418/AL618 | 63,5 [2.50] | 177,8 [7.00] | 19,05 [0.75] | 20,82 [0.82] | see below | 49,53 [1.95] | 38,1 [1.50] |



THREAD SIZES AND OPTION CODES

| Range (lb) | 13a | 13b | 13c | 13d | 13e |
|----------------|--------------|--------------|--------------|------------|--------------|
| | 1/2-20 UNF | 3/4-16 UNF | 7/8-14 UNF | 1-14 UNF | 1 1/2-12 UNF |
| 2000 to 5000 | AL414 | AL414 | - | - | - |
| 7500 to 15000 | - | AL416 | AL416 | AL416 | AL418 |
| 20000 | - | - | AL416 | AL416 | AL418 |
| 30000 to 50000 | - | - | - | - | AL418 |
| L2 mm [in] | 19,05 [0.75] | 24,13 [0.95] | 24,13 [0.95] | 25,4 [1.0] | 38,1 [1.50] |

TYPICAL SYSTEM DIAGRAM



NON-STANDARD RANGES - ORDER CODE AL412

| Range (lb) | Thread type | D mm [in] | L1 mm [in] | L2 mm [in] |
|------------------|--------------|--------------|---------------|--------------|
| 75000 to 100000 | 2 1/2-12 UNF | 114,3 [4.50] | 342,9 [13.50] | 88,9 [3.50] |
| 150000 to 200000 | 3 1/2-8 UNF | 139,7 [5.50] | 457,2 [18.00] | 114,3 [4.50] |

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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 three-wire units) or 80 % (voltage amplified units) of full scale output for quick calibration. Shunt calibration comes standard with internal amplifier option 2a, 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. Cannot be used with options 1c, 1e, 1f, 1g, 1h, or 1i.
7. Only available with option 2b or 2c.
8. Not available with amplified option.
9. Consult factory for TEDS availability with amplified models.
10. Termination dependent; consult factory.
11. This unit calibrated to Imperial (non-Metric) units.
12. 5000 ohm bridge required.

Find out more

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