

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 ⁵ | 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 ³ |
| 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 ¹ |
| 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 |

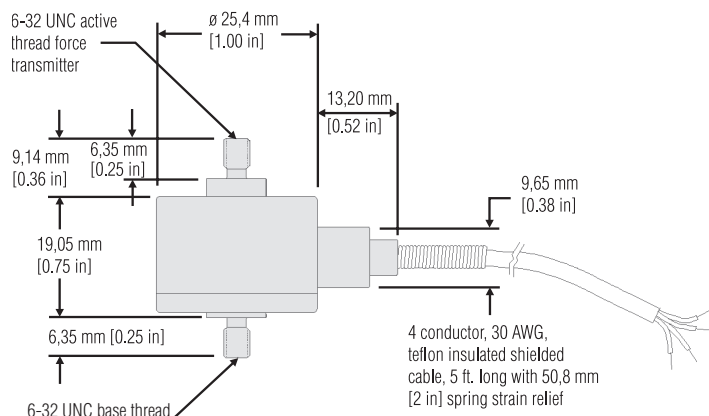
RANGE CODES

| 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 http://sensing.honeywell.com/TMsensor-ship for updated listings. | |
|---------------------------------|--|--|
| Load range | 50, 150, 250, 500 g | |
| 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 1j. 0 °F to 50 °C 1k. -20 °C to 85 °C 1m. -25 °C to 110 °C |
| Internal amplifiers | 2u. Unamplified, mV/V output | |
| Overload stops | 4a. Overload stop | |
| Electrical termination | 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 |
| Special calibration | 30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression | |
| Shock and vibration | 44a. Shock and vibration resistance | |
| Interfaces ⁴ | 53e. Signature calibration ⁶ 53t. TEDS IEEE 1451.4 module | |

MOUNTING DIMENSIONS

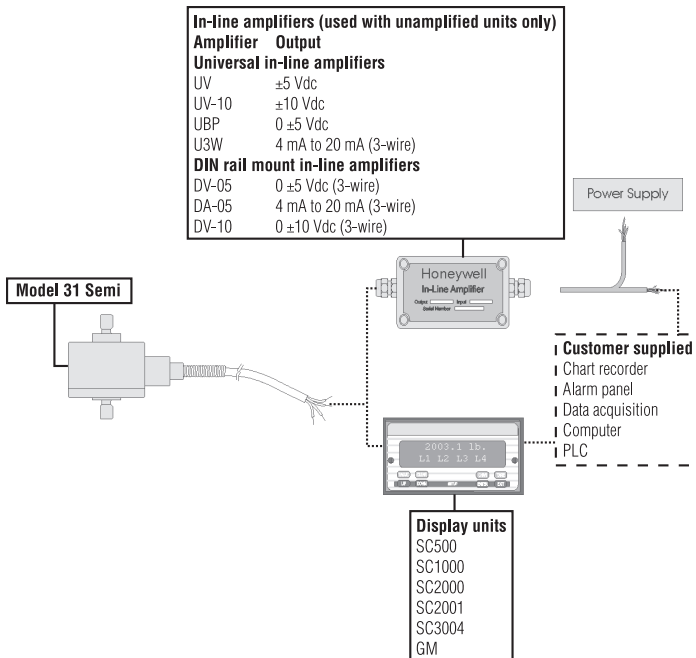


Model 31 Low

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 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.**

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For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847. Email inquiries to 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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Honeywell

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 ⁶ | 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 ³ |
| 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 ¹ |
| Weight | See table |
| Material | 17-4 PH stainless steel |
| Deflection full scale | See table |
| Natural frequency | See table |

RANGE CODES

| Range codes | Range |
|-------------|---------|
| AR | 1000 g |
| AT | 5 lb |
| AV | 10 lb |
| BL | 25 lb |
| BN | 50 lb |
| BR | 100 lb |
| CN | 250 lb |
| CR | 500 lb |
| CV | 1000 lb |

WIRING CODES

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

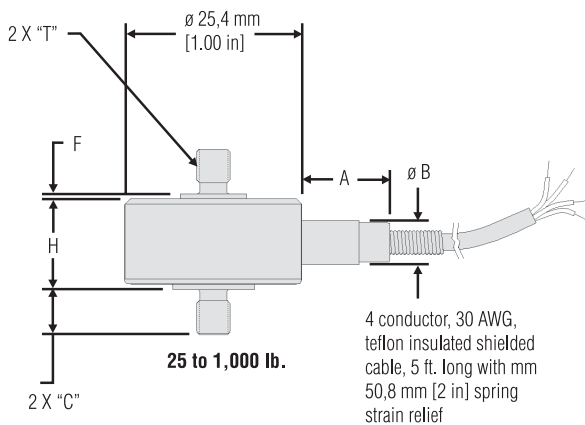
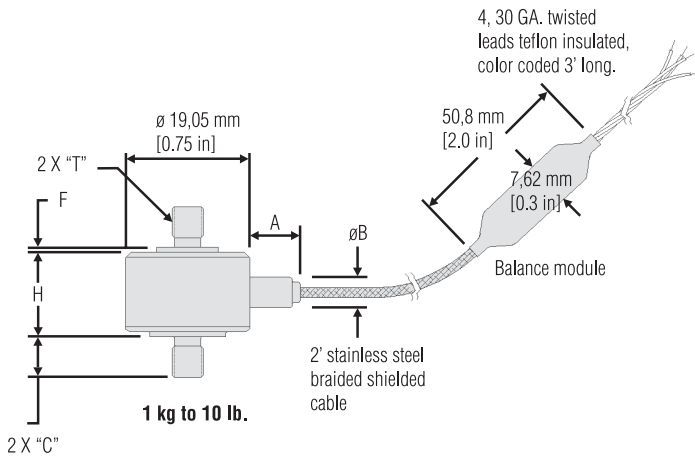
DEFLECTIONS AND RINGING FREQUENCIES

| 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

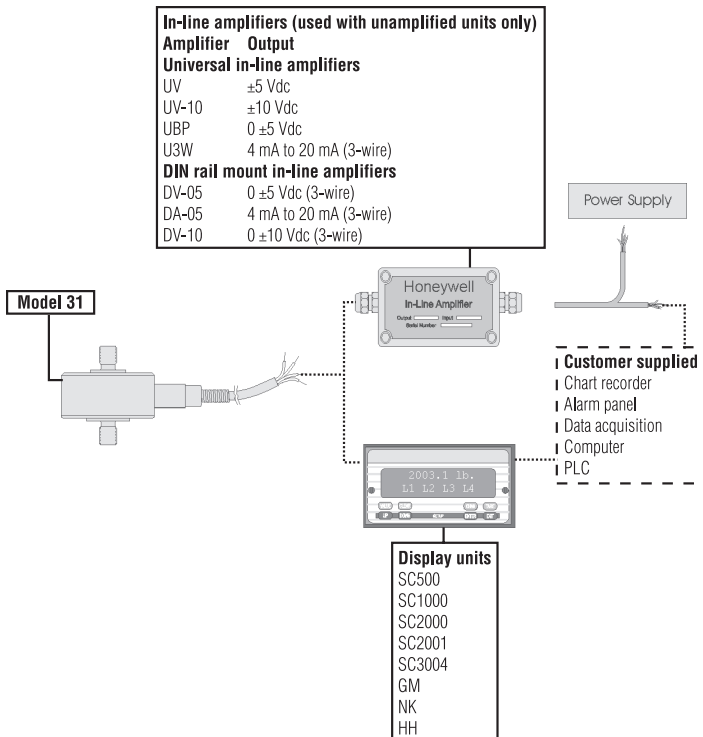
| | Many range/option combinations are available in our quick-ship and fast-track manufacture programs. Please see http://sensing.honeywell.com/TMsensor-ship for updated listings. | |
|---------------------------------|--|--|
| Load range | 1000 g, 5 lb, 10 lb, 25 lb, 50 lb, 100 lb, 250 lb, 500 lb, 1000 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 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 |
| Internal amplifiers | 2u. Unamplified, mV/V output | |
| Overload stops | 4a. Overload stops | |
| Electrical termination | 6a. Bendix PTIH-10-6P - 6 pin (max. 250 °F) ⁵ 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 |
| Special calibration | 9a. 10 point (5 up/5 down) 20 % increments @ 20 °C 9b. 20 point (10 up/10 down) 10 % increments @ 20 °C | |
| Special calibration | 30a. Compression only calibration, positive in compression 30b. Tension and compression calibration, positive in tension 30c. Compression only calibration, negative in compression | |
| Shock and vibration | 44a. Shock and vibration resistance | |
| Interfaces⁴ | 53e. Signature calibration ⁷ 53t. TEDS IEEE 1451.4 module | |

Model 31 Mid

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. 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 ⁵ | 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 ³ |
| 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 ¹ |
| 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 |

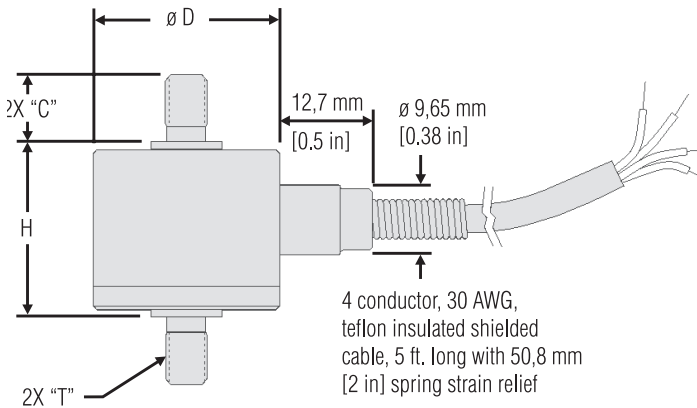
DEFLECTIONS AND RINGING FREQUENCIES

| 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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|---|--|---|
| Load range | 2000 lb, 3000 lb, 4000 lb, 5000 lb, 7500 lb, 10000 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 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 |
| Internal amplifiers | 2u. Unamplified, mV/V output | |
| Electrical termination | 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 |
| Bridge resistance | 12a. 1000 ohm (foil) 12b. 5000 ohm (foil) | |
| 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 | |
| Shock and vibration | 44a. Shock and vibration resistance | |
| Interfaces | 53e. Signature calibration ⁶ 53t. TEDS IEEE 1451.4 module ⁴ | |

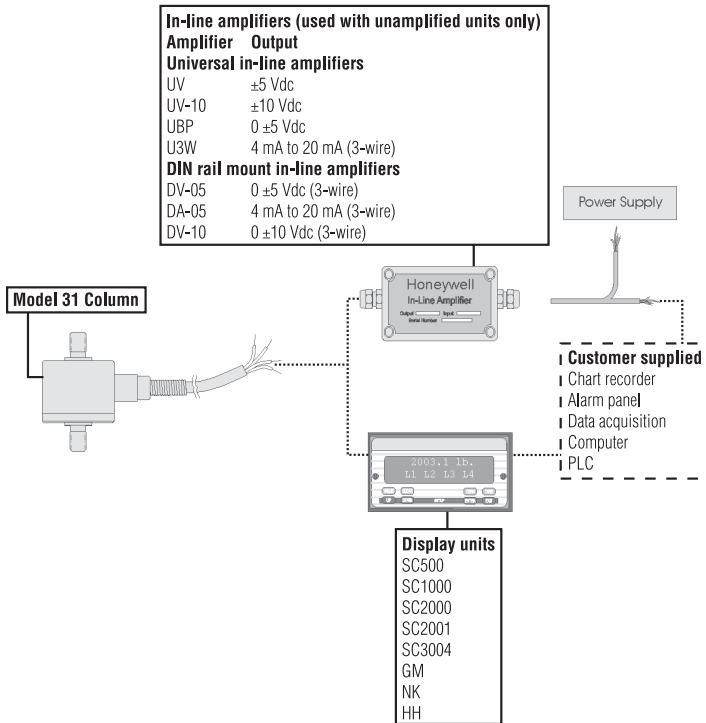
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