

# LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : CARNEGIE OBSERVATORIES  
 CONDITION: FINAL      PROCEDURE: C-1257      S.O. #: 18621  
 MODEL: 1010AF-5K      SERIAL: 96986      P.O. #: 18514  
 BRIDGE: A      CAPACITY: 5      K1bf

INPUT RESISTANCE: 350.4      OHM  
 OUTPUT RESISTANCE: 350.4      OHM  
 ZERO BALANCE : -0.419      %RO

## TEST CONDITIONS

TEMPERATURE: 75 °F      HUMIDITY: 33 %      EXCITATION: 10 VDC

## TRACEABILITY

FORCE STANDARD : STD-22      NIST #: 822.07/257462      DUE: 15-SEP-99  
 STANDARD INDICATOR: BRD106      NIST #: 811/249920-92  
 TEST INDICATOR : BRD109      NIST #: 811/249920-92

## SHUNT CALIBRATION

60 Kohm ± 0.01%      TENSION      COMPRESSION  
 OUTPUT      1.4563 mV/V      -1.4529 mV/V  
 STRAIGHT LINE conversion      3.3932 K1bf      3.3846 K1bf

Shunt calibration resistor connections for tension and compression respectively are (-EXC to -OUT) and (+EXC to -OUT) for connector models: (-SENSE to -OUT SHUNTCAL) and (+SENSE to -OUT SHUNTCAL) for 7 wire cable models.

## PERFORMANCE

|             | RATED OUTPUT | SEB OUTPUT   | NONLINEARITY | HYSTERESIS | SEB        |
|-------------|--------------|--------------|--------------|------------|------------|
| TENSION     | 2.1462 mV/V  | 2.1460 mV/V  | -.011 %FS    | .011 %FS   | ± .008 %FS |
| COMPRESSION | -2.1466 mV/V | -2.1464 mV/V | -.014 %FS    | .018 %FS   | ± .010 %FS |

STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

| TEST LOAD APPLIED ( K1bf) | RECORDED READINGS (mV/V) |             |
|---------------------------|--------------------------|-------------|
|                           | Tension                  | Compression |
| 0                         | .0000                    | .0000       |
| 1                         | .4291                    | -.4291      |
| 2                         | .8582                    | -.8584      |
| 3                         | 1.2875                   | -1.2877     |
| 4                         | 1.7168                   | -1.7171     |
| 5                         | 2.1462                   | -2.1466     |
| 2                         | .8585                    | -.8587      |
| 0                         | -.0002                   | .0001       |

Interface, Inc. certifies that all calibration measurements are traceable to NIST.  
 Estimated uncertainty of measurements is 0.05%  
 Do not reproduce this report except in full or with Interface written approval.

TECHNICIAN : *Paul Casey*

DATE : 23-FEB-98

INTERFACE INC.  
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 TELEPHONE (602)948-5555 · FAX (602)948-1924

# LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : CARNEGIE OBSERVATORIES  
 CONDITION: FINAL      PROCEDURE: C-1257  
 MODEL: 1010AF-5K      SERIAL: 98526  
 S.O. #: 18621  
 P.O. #: 18514  
 BRIDGE: A      CAPACITY: 5      K1bf

INPUT RESISTANCE: 350.6      OHM  
 OUTPUT RESISTANCE: 350.8      OHM  
 ZERO BALANCE : 0.205      %RO

## TEST CONDITIONS

TEMPERATURE: 75 °F      HUMIDITY: 34 %      EXCITATION: 10 VDC

## TRACEABILITY

FORCE STANDARD : STD-22      NIST #: 822.07/257462      DUE: 15-SEP-99  
 STANDARD INDICATOR: BRD106      NIST #: 811/249920-92  
 TEST INDICATOR : BRD109      NIST #: 811/249920-92

## SHUNT CALIBRATION

60 Kohm ± 0.01%      TENSION      COMPRESSION  
 OUTPUT      1.4563 mV/V      -1.4547 mV/V  
 STRAIGHT LINE conversion      3.3975 K1bf      3.3927 K1bf

Shunt calibration resistor connections for tension and compression respectively are (-EXC to -OUT) and (+EXC to -OUT) for connector models: (-SENSE to -OUT SHUNTCAL) and (+SENSE to -OUT SHUNTCAL) for 7 wire cable models.

## PERFORMANCE

|             | RATED OUTPUT | SEB OUTPUT   | NONLINEARITY | HYSTERESIS | SEB        |
|-------------|--------------|--------------|--------------|------------|------------|
| TENSION     | 2.1435 mV/V  | 2.1432 mV/V  | -.015 %FS    | .021 %FS   | ± .011 %FS |
| COMPRESSION | -2.1439 mV/V | -2.1438 mV/V | -.013 %FS    | .019 %FS   | ± .010 %FS |

STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

| TEST LOAD APPLIED ( K1bf) | RECORDED READINGS (mV/V) |             |
|---------------------------|--------------------------|-------------|
|                           | Tension                  | Compression |
| 0                         | .0000                    | .0000       |
| 1                         | .4284                    | -.4286      |
| 2                         | .8571                    | -.8573      |
| 3                         | 1.2858                   | -1.2861     |
| 4                         | 1.7146                   | -1.7150     |
| 5                         | 2.1435                   | -2.1439     |
| 2                         | .8575                    | -.8577      |
| 0                         | .0000                    | .0000       |

Interface, Inc. certifies that all calibration measurements are traceable to NIST.  
 Estimated uncertainty of measurements is 0.05%  
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TECHNICIAN: *M. Carson*

DATE : 26-MAR-98

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# LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : CARNEGIE OBSERVATORIES  
 CONDITION: FINAL      PROCEDURE: C-1257  
 MODEL: 1010AF-5K      SERIAL: 96977  
 S.O. #: 18621  
 P.O. #: 18514  
 BRIDGE: A      CAPACITY: 5      K1bf  
 INPUT RESISTANCE: 350.3      OHM  
 OUTPUT RESISTANCE: 350.2      OHM  
 ZERO BALANCE : -0.149      %RO

## TEST CONDITIONS

TEMPERATURE: 75 °F      HUMIDITY: 25 %      EXCITATION: 10 VDC

## TRACEABILITY

FORCE STANDARD : STD-22      NIST #: 822.07/257462      DUE: 15-SEP-99  
 STANDARD INDICATOR: BRD106      NIST #: 811/249920-92  
 TEST INDICATOR : BRD109      NIST #: 811/249920-92

## SHUNT CALIBRATION

60 Kohm ± 0.01%      TENSION      COMPRESSION  
 OUTPUT      1.4540 mV/V      -1.4553 mV/V  
 STRAIGHT LINE conversion      3.3847 K1bf      3.3869 K1bf

Shunt calibration resistor connections for tension and compression respectively are (-EXC to -OUT) and (+EXC to -OUT) for connector models: (-SENSE to -OUT SHUNTCAL) and (+SENSE to -OUT SHUNTCAL) for 7 wire cable models.

## PERFORMANCE

|             | RATED OUTPUT | SEB OUTPUT   | NONLINEARITY | HYSTERESIS | SEB        |
|-------------|--------------|--------------|--------------|------------|------------|
| TENSION     | 2.1479 mV/V  | 2.1479 mV/V  | -.010 %FS    | .020 %FS   | ± .010 %FS |
| COMPRESSION | -2.1486 mV/V | -2.1484 mV/V | -.018 %FS    | .020 %FS   | ± .012 %FS |

STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

| TEST LOAD APPLIED ( K1bf) | RECORDED READINGS (mV/V) |             |
|---------------------------|--------------------------|-------------|
|                           | Tension                  | Compression |
| 0                         | .0000                    | .0000       |
| 1                         | .4294                    | -.4295      |
| 2                         | .8589                    | -.8591      |
| 3                         | 1.2886                   | -1.2888     |
| 4                         | 1.7182                   | -1.7186     |
| 5                         | 2.1479                   | -2.1486     |
| 2                         | .8594                    | -.8595      |
| 0                         | -.0001                   | .0001       |

Interface, Inc. certifies that all calibration measurements are traceable to NIST. Estimated uncertainty of measurements is 0.05%. Do not reproduce this report except in full or with Interface written approval.

TECHNICIAN : *Mark Casper*

DATE : 29-JAN-98

INTERFACE INC.  
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# LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : CARNEGIE OBSERVATORIES  
CONDITION: FINAL      PROCEDURE: C-1257      S.O. #: 18621  
MODEL: 1010AF-5K      SERIAL: 96899      P.O. #: 18514  
BRIDGE: A      CAPACITY: 5      K1bf

INPUT RESISTANCE: 350.6      OHM  
OUTPUT RESISTANCE: 350.4      OHM  
ZERO BALANCE : -0.102      %RO

## TEST CONDITIONS

TEMPERATURE: 75 °F      HUMIDITY: 33 %      EXCITATION: 10 VDC

## TRACEABILITY

FORCE STANDARD : STD-22      NIST #: 822.07/257462      DUE: 15-SEP-99  
STANDARD INDICATOR: BRD106      NIST #: 811/249920-92  
TEST INDICATOR : BRD109      NIST #: 811/249920-92

## SHUNT CALIBRATION

60 Kohm ± 0.01%      TENSION      COMPRESSION  
OUTPUT      1.4554 mV/V      -1.4554 mV/V  
STRAIGHT LINE conversion      3.3904 K1bf      3.3894 K1bf

Shunt calibration resistor connections for tension and compression respectively are (-EXC to -OUT) and (+EXC to -OUT) for connector models; (-SENSE to -OUT SHUNTCAL) and (+SENSE to -OUT SHUNTCAL) for 7 wire cable models.

## PERFORMANCE

|             | RATED OUTPUT | SEB OUTPUT   | NONLINEARITY | HYSTERESIS | ± | SEB      |
|-------------|--------------|--------------|--------------|------------|---|----------|
| TENSION     | 2.1463 mV/V  | 2.1463 mV/V  | -.010 %FS    | .019 %FS   | ± | .010 %FS |
| COMPRESSION | -2.1472 mV/V | -2.1470 mV/V | -.016 %FS    | .010 %FS   | ± | .011 %FS |

STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

| TEST LOAD APPLIED ( K1bf) | RECORDED READINGS (mV/V) |             |
|---------------------------|--------------------------|-------------|
|                           | Tension                  | Compression |
| 0                         | .0000                    | .0000       |
| 1                         | .4291                    | -.4292      |
| 2                         | .8583                    | -.8585      |
| 3                         | 1.2876                   | -1.2880     |
| 4                         | 1.7169                   | -1.7176     |
| 5                         | 2.1463                   | -2.1472     |
| 2                         | .8587                    | -.8588      |
| 0                         | -.0001                   | .0002       |

Interface, Inc. certifies that all calibration measurements are traceable to NIST. Estimated uncertainty of measurements is 0.05%. Do not reproduce this report except in full or with Interface written approval.

TECHNICIAN 

DATE :19-FEB-98

INTERFACE INC.  
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## TWO YEAR WARRANTY

Interface, Inc. hereby warrants all products of its manufacture as follows: Commencing with the date of shipment of each load cell to the original purchaser, and for a period expiring two years from said date, Interface, Inc. warrants that each unit shall remain free from defects in parts, materials, and workmanship.

The warranties herein shall not obligate Interface, Inc. in any manner whatsoever with respect to, and shall not be applicable to, any defects which after inspection by Interface, Inc. are not to Interface, Inc.'s reasonable satisfaction demonstrably the result of defective parts, materials or workmanship. Interface is not liable for consequential or contingent damages and its liability is strictly limited to the original purchase price of the product or its repair or replacement at Interface's option. The factory should be immediately notified of suspected warranty claims. All transportation, handling, customs clearance and insurance charges for returned merchandise are to be prepaid and borne by customer.

The foregoing warranty is in lieu of any and all other warranties or guarantees expressed or implied and of all other obligations on the part of Interface, Inc. whether in contract or in tort. This warranty shall be void on any Interface product which has been subject to misuse, negligence or accident, or has been installed, adjusted or used otherwise than in accordance with the instructions furnished by Interface, Inc.

## CERTIFICATION

Interface, Inc. certifies that this load cell was thoroughly tested and inspected and found to meet its published specifications when shipped from the factory. Interface, Inc. further certifies that its calibration measurements are traceable to NIST.

## INSTALLATION

See Installation Information Sheet for Instructions.

## WIRING

| CONNECTOR |                             | CABLE (ALL MODELS) |               |
|-----------|-----------------------------|--------------------|---------------|
| PIN       | FUNCTION                    | COLOR              | FUNCTION      |
| A         | + Excitation                | Red                | + Excitation  |
| B         | + Output (positive reading) | Green              | + Output      |
| C         | - Output (for tension)      | White              | - Output      |
| D         | - Excitation                | Black              | - Excitation  |
| E         | No Connection               | White/Red          | + Sense       |
| F         | No Connection               | White/Black        | - Sense       |
|           |                             | White/Yellow       | Shunt Cal.    |
|           |                             | Shield             | No Connection |

# Interface Load Cell

## CALIBRATION CERTIFICATION

## WARRANTY

## INSTALLATION INFORMATION