

C705P Digital Indicator Meter Instruction Manual



7. Move from one "A1" parameter to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from A1-1 to A1-2, press the DATA key. To go from A1-2 back to A1-1, press the PROFILE key.
8. Once you have arrived at the proper "A1" menu parameter, e.g., "A1-1", press the ZERO (down) key once to arrive at the selection level. The instrument displays the current parameter setting.
9. If there is a selection list, scroll thru the available parameter settings, use the PROFILE (left) or DATA (right) keys. Otherwise, use the arrow keys to adjust the displayed value to the new value.
10. Once the setting you want is displayed on the screen, press the PEAK/FREEZE (set) key to save this value and revert up to the parameter level, e.g., "A1-1".

1.12 Leaving the User/COM1 ("A1") Configuration Menu

1. While on any level except the selection level, press the MENU/OFF key.

1.13 User/COM1 ("A1") Menu Descriptions

This section provides more detailed descriptions of the selections found in the User/COM1 Menu Chart. Factory-set defaults are shown in **bold** with a checkmark; (√).

CODE/NAME	DESCRIPTION	SELECTION LIST
A1-1 Baud Rate	Selects the baud rate for data transmission through the serial port.	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 √
A1-2 Data & Parity Bits	Selects the number of data bits and parity of serial transmission. "8 n" = 8 data bits with no parity bit and one stop bit "7 o" = 7 data bits with odd parity bit and one stop bit "7 E" = 7 data bits with even parity bit and one stop bit "7 n" = 7 data bits with no parity bit and two stop bits	8 n √ 7 o 7 E 7 n
A1-24 Diagnostics	Used to access the listed test functions (one at a time). Pressing the ZERO key begins the sequence. "A1-24-1" = Display segment test, "A1-24-2" = A/D converter test, "A1-24-5" = Serial Port test (both), "A1-24-6" = Keyboard test	Press ZERO key to begin sequence

Diagnostics (A1-24)

Here is a brief description of each test mode:

A1-24-1 Display Test – Lights up all display segments. End test manually by pressing the PEAK/FREEZE (Set) key.

A1-24-2 ADC Test – Shows internal A/D converter counts – useful for troubleshooting weighing issues. End test manually by pressing the PEAK/FREEZE (Set) key. The Zero key works in this mode.

A1-24-5 Serial Test – Transmits a data string continuously out both serial ports (“TEST1” on COM1 and “TEST2” on COM2). End test manually by pressing the PEAK/FREEZE (Set) key.

A1-24-6 Keyboard Test – Displays a keycode for each key pressed on the keypad. See Table below. End test manually by pressing the PEAK/FREEZE (Set) key.

Key	Keycode
Menu/Off	12
Units	1
Zero	2
Peak	EXIT
Profile	4
Data	5

1.14 Entering the COM2 (“A2”) Menu

1. Switch off the instrument by pressing the MENU/OFF key (“oFF”) followed by the PEAK/FREEZE key.
2. Press and hold the ON key until the instrument beeps and starts to boot up.
3. During the countdown phase (“555555, 444444”, etc.) press and hold the MENU/OFF key until the “Set?” message is displayed.
4. Press the PEAK/FREEZE button while “Set?” is being displayed. The instrument displays “-F-”.
5. Press the DATA (right) key four times. The screen displays “-A2-”.
6. Scroll down using the ZERO (down) key to reach the parameter level. The force instrument shows “A2-1”.

7. Move from one "A2" parameter to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from A2-1 to A2-2, press the DATA key. To go from A2-2 back to A2-1, press the PROFILE key.
8. Once you have arrived at the proper "A2" menu parameter, e.g., "A2-1", press the ZERO (down) key once to arrive at the selection level. The instrument displays the current parameter setting.
9. If there is a selection list, scroll thru the available parameter settings, use the PROFILE (left) or DATA (right) keys. Otherwise, use the arrow keys to adjust the displayed value to the new value.
10. Once the setting you want is displayed on the screen, press the PEAK/FREEZE (set) key to save this value and revert up to the parameter level, e.g., "A2-1".

1.15 Leaving the COM2 ("A2") Configuration Menu

1. While on any level except the selection level, press the MENU/OFF key.

1.16 COM2 ("A2") Menu Descriptions

This section provides more detailed descriptions of the selections found in the COM2 Menu Chart. Factory-set defaults are shown in **bold** with a checkmark; (√).

CODE/NAME	DESCRIPTION	SELECTION LIST
A2-1 Baud Rate	Selects the baud rate for data transmission through the serial port.	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 √
A2-2 Data & Parity Bits	Selects the number of data bits and parity of serial transmission. "8 n" = 8 data bits with no parity bit and one stop bit "7 o" = 7 data bits with odd parity bit and one stop bit "7 E" = 7 data bits with even parity bit and one stop bit "7 n" = 7 data bits with no parity bit and two stop bits	8 n √ 7 o 7 E 7 n
A2-6 Output String (Data Format)	Selects the fixed output string for the COM2 serial port. Refer to Serial Port Info for details. "0" = String Format 1 (Morehouse) "1" = String Format 2 (Transcell)	0 √ 1



INSTRUMENT CALIBRATION

2.1 Calibration Overview

There are two ways to calibrate the instrument:

1. Live calibration: You will be calibrating an actual load sensor to the instrument using live test loads. You can have up to seven positive calibration points and up to seven negative calibration points. These calibration points are denoted as C1 through C7. The absolute value of each subsequent calibration point should be higher than the last, e.g., the C2 value should be greater than the C1 value, etc.
2. Polynomial Equations¹: You will be entering B coefficients from a calibration report. You can enter up to four positive B coefficients and up to four negative B coefficients. These B coefficients are denoted as B0 through B3. This must be used in conjunction with a reference calibration using a calibrator. See G16 and G17 for reference calibration instructions.

Note: to disable PFX-F15 or PFX-F17, simply enter a zero value (e.g., "0.0") for C1.

2.2 Live Calibration Overview

Live calibration comprises two main steps: zero calibration (PFX-F16) and span calibration (PFX-F17). However, a third calibration for negative span (PFX-F15) is also available for systems operating in both tension and compression.

Here is the recommended sequence for multiple fixtures and multiple calibration points:

1. Put force sensor onto test fixture
2. Go to **PFX-F17** and press the down key; indicator prompts for the first calibration point
3. key in number 111111 and press the PEAK key; indicator will show "FIT" momentarily and then automatically record the fixture reference point
4. Follow the **PFX-F17** procedure as written for up to seven calibration points
5. If necessary, repeat these steps for negative span calibration (**PFX-F15**)
6. Mount the force sensor onto the final fixture
7. Go to **PFX-F16** and perform zero calibration

2.3 Live Span Calibration Instructions (PFX-F17)

1. While in the Setup mode, scroll to " **PFX-F17** ", and then scroll down once using the ZERO (down) key. The instrument will briefly display 'C 1' and then prompt you to enter the data for the first calibration point (C1). The previously saved force value will be displayed with one digit blinking.

¹ Force (lbf) = B₀ + B₁R + B₂R² + B₃R³

2. Use the four directional keys to adjust the displayed value to 11111 and press the PEAK (set) key; instrument will show "FIT" momentarily and then automatically record the fixture reference point. The previously saved force value will be displayed with one digit blinking.
3. Place the first test load onto the force sensor.
4. Use the four directional keys to enter in the actual positive force value, e.g., 1000.0 lbf. Increase the flashing digit by pressing the UNITS key. Decrease the flashing digit by pressing the ZERO key. Pressing the PROFILE key or the DATA key will change the position of the flashing digit.
5. Press the PEAK (set) key to save the value. The indicator briefly displays 'End C1' and then moves to the next calibration point (C2).
6. Repeat steps 3 through 5 to enter data for the remainder of the calibration points. **You need not enter data for all seven calibration points. To cease entering additional calibration points, simply enter zero for the new value, e.g., 0.0 lbf.**
7. At the conclusion of C7 (or the last calibration point), the instrument will show "-donE" and reverts to the top setup menu level, i.e.: "-F-".

If the calibration was *not* successful, one of the following error messages will appear.

- "Err0" - The calibration test load or the keyed-in load is larger than the full capacity of the instrument. Change the calibration test load or check the input data.
- "Err1" - The calibration test load or the keyed-in load is smaller than 1% of the full capacity of the instrument. Change the calibration test load or check the input data.
- "Err2" – There is not enough signal from the force sensor to complete the calibration process. Most common causes include incorrect force sensor wiring, a mechanical obstruction or a faulty (damaged) force sensor.

Take the indicated action to correct the problem, and then perform a new calibration.

2.4 Live Negative Span Calibration Instructions (PFx-F15)

For negative calibration data, you will not see a minus sign on the screen. You need not be concerned as all data entered is presumed to be a negative value, e.g., 1000.0 lbf is really -1000.0 lbf.

1. While in the Setup mode, scroll to " **PFx-F15**", and then scroll down once using the ZERO (down) key. The indicator will briefly display 'C 1' and then prompt you to enter the data for the first calibration point (C1). The previously saved force value will be displayed with one digit blinking.
2. Use the four directional keys to adjust the displayed value to 11111 and press the PEAK (set) key; indicator will show "FIT" momentarily and then automatically record the fixture reference point. The previously saved force value will be displayed with one digit blinking.
3. Place the first test load onto the force sensor.



4. Use the four directional keys to the actual positive force value, e.g., 1000.0 lbf. Increase the flashing digit by pressing the UNITS key. Decrease the flashing digit by pressing the ZERO key. Pressing the PROFILE key or the DATA key will change the position of the flashing digit.
5. Press the PEAK (set) key to save the value. The indicator briefly displays 'End C1' and then moves to the next **negative** calibration point (C2).
6. Repeat steps 3 through 5 to enter data for the remainder of the calibration points. **You need not enter data for all seven calibration points. To cease entering additional calibration points, simply enter zero for the new value, e.g., 0.0 lbf.**
7. At the conclusion of C7 (or the last calibration point), the instrument will show "-donE" and reverts to the top setup menu level, i.e.: "-F-".

2.5 Live Calibration - Zero Instructions (PFx-F16)

1. While in the Setup mode, scroll to " **PFx-F16**", and then scroll down once using the ZERO (down) key. The display will momentarily show "**C 0**" followed by a value. This value is the internal A/D count and can prove useful when trying to troubleshoot setup problems.
2. Mount the force sensor onto the final fixture, assure a no-load condition and then press the PEAK (set) key to save the zero-point value. The display will show "**SET**" and "**EndC0**" momentarily, and then revert up to Pfx-F16.

2.6 Entering B coefficient values for Compression Negative Span (PFx-CBx)

The B coefficient values for Compression Negative Span are entered one at a time in the "P" menu, using two separate screens (pages). This example sets CB0 [B0 Compression Negative Span] to -1.210034E+03 using the PF1-CB0 menu. All other menus [PF1-CB1, PF1-CB2 and PF1-CB3] operate the same way.

Example: B0 = -1.210034E+03,

Page1: [1].[2][1][0][0][3][4] (B coefficient value)

Page2: [-] [] [] [] [E][P][0][3] (sign convention and exponent)

1. While in the Setup mode, scroll to " **PF1-CB0** ", and then scroll down once using the ZERO (down) key. The instrument will briefly display '**1 of 2**' and then prompt you to enter the B coefficient value. The previously saved B coefficient value will be displayed with one digit blinking.
2. Use the four directional keys to adjust the displayed value to the proper B0 coefficient value and press the PEAK (set) key. The instrument will briefly display '**2 of 2**' and then prompt you to enter the sign convention and exponent value. The previously saved sign convention and exponent value will be displayed with one digit blinking.
3. Use the four directional keys to adjust the displayed value to the proper sign convention and exponent value and press the PEAK (set) key. The instrument will briefly display '**SET**' and revert to the **PF1-CB0** menu level.
4. Repeat steps 1 through 3 as needed for the other Compression Negative Span B coefficient values.



2.7 Entering B coefficient values for Tension Positive Span (PFx-TBx)

Same as previous section, only using the PF1-TB0, PF1-TB1, PF1-TB2 and PF1-TB3 menus.

2.8 Reference (mV/V) Calibration - Zero Instructions (G16)

You will be teaching your instrument the 0.0 mV/V setting of your calibrator. (C0)

1. While in the Setup mode, scroll to " **G16** ", and then scroll down once using the ZERO (down) key. The instrument will briefly display '**Code ?**' and then prompt you to enter the password. Six zeros are now displayed with one blinking.
2. Use the four directional keys to adjust the displayed value to the password and press the PEAK (set) key. The display will momentarily show "**C 0**" followed by a value. This value is the internal A/D count and can prove useful when trying to troubleshoot setup problems.
3. Move your calibrator to the 0.0 mV/V setting and press the PEAK (set) key. The instrument will briefly display '**SET**' and revert to the **G16** menu level.

2.9 Reference (mV/V) Calibration - Span Instructions (G17)

You will be teaching your instrument the mV/V setting of your choice using your calibrator. (C1)

1. While in the Setup mode, scroll to " **G17** ", and then scroll down once using the ZERO (down) key. The instrument will briefly display '**Code ?**' and then prompt you to enter the password. Six zeros are now displayed with one blinking.
2. Use the four directional keys to adjust the displayed value to the password and press the PEAK (set) key. The display will momentarily show "**C 1**" followed by Six zeros with one blinking.
3. Use the four directional keys to adjust the displayed value to the mV/V setting of your choice, e.g., 2.00000.
4. Move your calibrator to the mV/V setting of your choice and press the PEAK (set) key. The instrument will briefly display '**SET**' and revert to the **G17** menu level.

ADVANCED OPERATION

3.1 Peak Hold Mode

This mode is used to capture and hold peak forces recorded during a specific process. The most common application is evaluating the breaking point of a part or assembly. The instrument records both positive and negative peak forces.

This mode of operation is enabled by changing the F30 parameter setting to "5".

1. Push the PEAK key to activate positive peak mode; the instrument briefly displays "HoLd P" and then the "P" annunciator turns ON.
2. Apply force to the item under test. The display indicates and holds the positive peak force applied.



3. To activate negative peak mode, press the PEAK key again; the instrument briefly displays “HoLd U”.
4. To reset both peak values to zero, press and hold the PEAK key for about 3 seconds until the display shows “Clr P”.
5. To exit peak hold mode, press the PEAK key again; the instrument briefly displays “LiVE” and then the “P” annunciator turns OFF.

3.2 Reading Overflow

When the reading displays “oooooo” the calculated force exceeds the displayable force. This happens when the calculated force exceeds $\pm 1,000,000$ units.

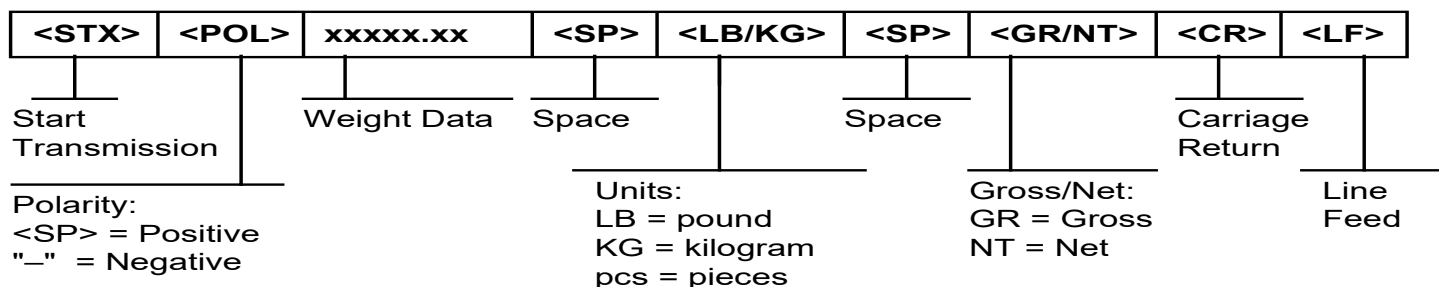
SERIAL PORT INFO

The instrument features two-way serial communications. Force data is transmitted on demand, i.e., upon receiving a recognized command from the host device. Data is also transmitted when the DATA key is pressed.

OUTPUT STRINGS

TRANSCELL DATA FORMAT

String Format 1 is designed for two-way communication.



RECOGNIZED HOST COMMANDS

ASCII code (Hex)	Symbol	Action by the instrument
50	P	Transmit the displayed force data through the serial port.
70	p	Transmit the displayed force data through the serial port.
5A	Z	Zero the instrument
7A	z	Zero the instrument
43	C	Change the displayed unit of measure
63	c	Change the displayed unit of measure