

C705P Digital Indicator Meter Instruction Manual





Table of Contents

DISPLAY & KEYPAD DETAILS	2
INSTALLATION & OVERVIEW	4
Installation of C705P force data instrument	4
Power Connections	5
USB Port	5
Getting Started	5
SYSTEM CONFIGURATION	6
1.1 Configuration Menus	6
1.2 Entering the Setup (“F”) Configuration Menu	7
1.3 Leaving the Setup (“F”) Configuration Menu	7
1.4 Setup (“F”) Menu Descriptions	8
1.5 Entering the Polynomial (“P”) Configuration Menu	8
1.6 Leaving the Polynomial Setup (“P”) Configuration Menu	9
1.7 Polynomial Setup (“P”) Menu Descriptions	9
1.8 Entering the General (“G”) Configuration Menu	10
1.9 Leaving the General (“G”) Configuration Menu	11
1.10 General (“G”) Menu Descriptions	11
1.11 Entering the User/COM1 (“A1”) Menu	12
1.12 Leaving the User/COM1 (“A1”) Configuration Menu	13
1.13 User/COM1 (“A1”) Menu Descriptions	14
1.14 Entering the COM2 (“A2”) Menu	14
1.15 Leaving the COM2 (“A2”) Configuration Menu	15
1.16 COM2 (“A2”) Menu Descriptions	15
INSTRUMENT CALIBRATION	16
2.1 Calibration Overview	16
2.2 Live Calibration Overview	16
2.3 Live Span Calibration Instructions (PFx-F17)	17
2.4 Live Negative Span Calibration Instructions (PFx-F15)	17
2.5 Live Calibration - Zero Instructions (PFx-F16)	18
2.6 Entering B coefficient values for Compression Negative Span (PFx-CBx)	18
2.7 Entering B coefficient values for Tension Positive Span (PFx-TBx)	18
2.8 Reference (mV/V) Calibration - Zero Instructions (G16)	19
2.9 Reference (mV/V) Calibration - Span Instructions (G17)	19
ADVANCED OPERATION	19
3.1 Peak Hold Mode	19
3.2 Reading Overflow	20
SERIAL PORT INFO	20
OUTPUT STRINGS	20



DISPLAY & KEYPAD DETAILS

This instrument utilizes a 7-digit LCD (Liquid Crystal Display) with adjustable LED backlight.

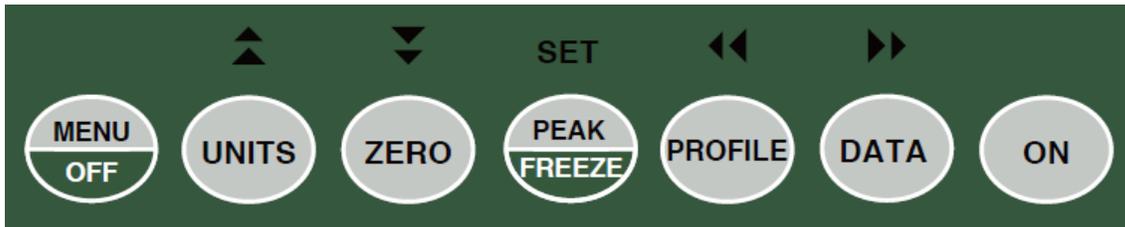


The Table below summarizes the display annunciators:

Symbol	Display Indication
→0	Indicates that the instrument is in Tare mode.
P	Indicates that the instrument is in PEAK HOLD mode
T	The Tension mode shows "T"; The Compression mode shows " "
mV/V	Indicates that the unit of the displayed value is in millivolts per volt
Tf	Indicates that the unit of the displayed force is in tonne-force
klbf	Indicates that the unit of the displayed force is in kilopounds (kips)
lbf	Indicates that the unit of the displayed force is in pounds
kN	Indicates that the unit of the displayed force is in kilonewtons
N	Indicates that the unit of the displayed force is in Newtons
kgf	Indicates that the unit of the displayed force is in kilograms
▲▲	This light is on whenever the instrument is at rest (i.e., a stable reading).



The capacitive touch keypad is composed of a total of seven (7) function keys.



Marking	Keypad Functions
Menu/Off	This key provides access to the various configuration menus (see System Configuration) To turn the instrument OFF: <ol style="list-style-type: none"> 1. Press MENU/OFF key. 2. Press the PEAK/FREEZE button while "oFF?" is being displayed.
Units	Selects the displayed unit of measure: Note: If Primary Unit is lbf, kgf, or N , then avail. units are mV/V, lbf, kgf, and N If Primary Unit is klf, Tf, or kN , then avail. units are mV/V, klf, Tf, and kN
Zero	The Zero key functions as a Tare ("->0<-" on display)
Peak/Freeze	<u>Peak</u> : Selects the peak hold display mode of the instrument, e.g., live data, positive peak and negative peak. <u>Freeze</u> : Pressing this key causes the display to stay constant (stop updating) until this button is pressed again
Profile	Selects the one of the five available profiles [PF-1 to PF-5]; this action also takes the instrument out of Tare mode.
Data	Sends the displayed data to the serial communication port.
On	Press and hold for 2-3 seconds to turn the unit ON.
SET & arrows	Utilized in the various configuration menus (see System Configuration)

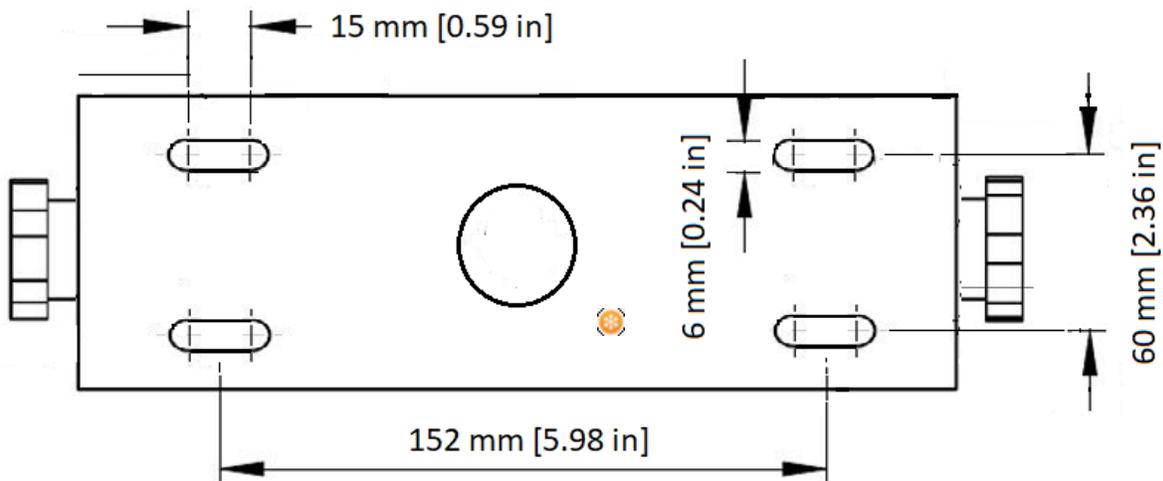


INSTALLATION & OVERVIEW

Remember that the installer is ultimately responsible to assure that an installation will be and remain safe and operable under the specific conditions encountered.

Installation of C705P force data instrument

Find a suitable location for the instrument and use the included bracket to mount the unit to a wall or table. Use this handy guide for mounting the bracket to a wall or table:



CONNECTIONS

The rear cover must first be removed to make the appropriate connections to the weigh platform, etc. To remove the rear cover, remove the screws that secure it to the enclosure and set aside.

Caution! Disconnect the power source from the instrument prior to removing the rear cover.

Force sensor Connections

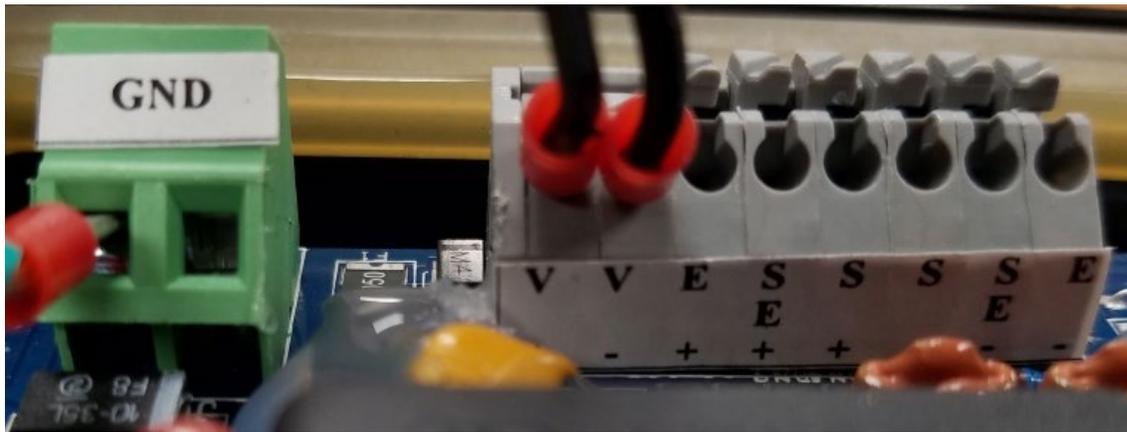
Connect your shielded force sensor cable to terminal block J1 using the table below. All terminals are labeled for function.

TIP: You should have the color codes handy for your force sensor before doing so.

Force sensor Terminal Block J1



Marking	Function	Marking	Function
GND	Shield	S-	- Signal
E+	+ Excitation	SE-	- Sense
SE+	+ Sense	E-	- Excitation
S+	+ Signal		



NOTE1: Use G11 to configure for 4-wire or 6-wire force sensors

NOTE2: Pins 1 and 2 are for DC power input (V+ and V- respectively) ...

NOTE3: There are two configurations for J1, as shown above, and differing only in the location of the force sensor shield wire connection (GND)

USB Port

The external USB port is used for communication and updating of the firmware. Consult factory for use.

Getting Started

1. Press and hold the ON key on the force instrument for two seconds.
After a brief initialization period, the instrument will revert to a zero ("0") force display.

Your instrument is now ready for configuration and system calibration.

SYSTEM CONFIGURATION

1.1 Configuration Menus

The C705P instrument contains five menus to configure the calibration system:

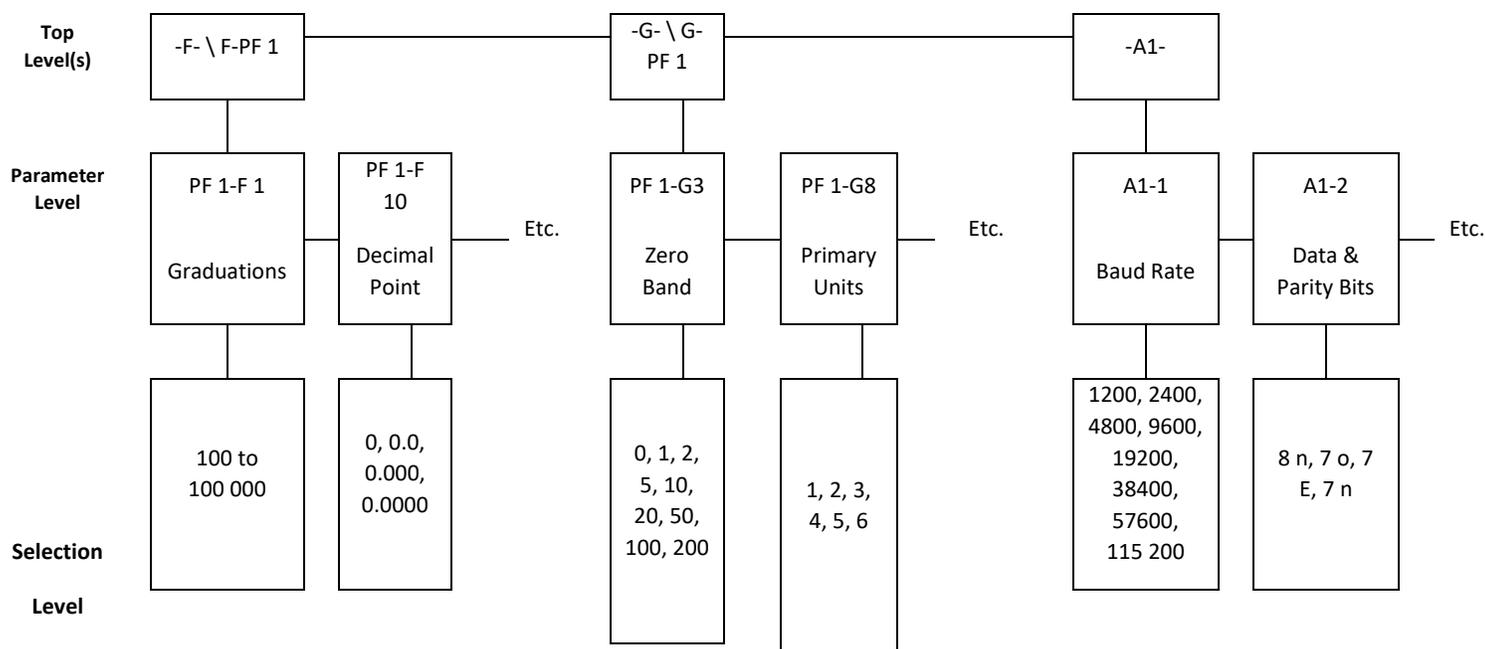
1. Setup ("F") Menu – Configures all scaling parameters, including calibration procedures. All Profiles [PF1-PF5]
2. Polynomial Setup ("P") Menu – Configures all Polynomials. All Profiles [PF1-PF5]
3. General Setup ("G") Menu – Configures general measurement parameters. Settings apply to all Profiles [PF1-PF5]
4. User1 ("A1") Menu – Configures COM1 communication parameters and other misc. parameters, e.g., automatic turn off and hold mode.
5. User2 ("A2") Menu – Configures COM2 communication parameters.

The configuration menus are laid out in the following vertical arrangement:

- Top [Menu selection] level [Note: some menus may have a secondary top level, e.g., -F- and F-PF 1]
- Parameter level
- Selection level (or function level, e.g., span calibration)

Please review the following chart to get a feel for how to navigate among the various menus and parameters.

NOTE: The -C- menu appears in place of the -B- menu for cabled systems.





1.2 Entering the Setup (“F”) Configuration Menu

Note: This configuration menu has five (5) secondary-top levels - PF 1 to PF 5 - corresponding to the give (5) profiles (PF-1 to PF-5). Instructions are identical for each profile.

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. Scroll down one level by using the ZERO (down) key to reach the secondary top level. The instrument shows “F-PF 1”.
6. Move from one profile [PF 1 to PF 5] to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from F-PF 1 to F-PF 2, press the DATA key. To go from F-PF 2 back to F-PF 1, press the PROFILE key.
7. Scroll down using the ZERO (down) key to reach the parameter level. The instrument shows “PF1-F 1”.
8. Move from one “PF1-F” menu parameter to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from PF1-F 1 to PF1-F 10, press the DATA key. To go from F- PF1-F 10 back to PF1-F 1, press the PROFILE key.
9. Once you have arrived at the proper “PF1-F” menu parameter, e.g., “PF1-F 1”, press the ZERO (down) key once to arrive at the selection level. The instrument displays the current parameter setting.
10. 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.
11. 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., “PF1-F 1”.

1.3 Leaving the Setup (“F”) Configuration Menu

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



1.4 Setup (“F”) Menu Descriptions

This section provides more detailed descriptions of the selections found in the Setup Menu Chart.

The menus are identical for each profile (PF-1 to PF-5). Detailed instructions can be found in the next section [Instrument Calibration]. Factory-set defaults are shown in **bold** with a checkmark; (√).

CODE/NAME	DESCRIPTION	SELECTION LIST
PF1-F10 Decimal Point	Sets the decimal point value. Use together with PF1-F9.	0 √ 0.0000 0.000 0.00 0.0
PF1-F15 Span Calibration - Negative	Places instrument into live compression negative (-) span calibration mode. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-F16 Zero Calibration	Places instrument into live zero-calibration mode. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-F17 Span Calibration - Positive	Places instrument into live tension positive (+) span calibration mode. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-F18 Enable Compression Calibration	If this setting is enabled it would use the compression linearization calibration. If disabled it would only use tension linearization. 1=Enabled 0=Disabled	1 √ 0
PF1-F19 Enable Tension Calibration	If this setting is enabled it would use the tension linearization calibration. If disabled it would only use compression linearization. 1=Enabled 0=Disabled	1 √ 0

1.5 Entering the Polynomial (“P”) Configuration Menu

Note: This configuration menu has five (5) secondary-top levels - PF 1 to PF 5 - corresponding to the give (5) profiles (PF-1 to PF-5). Instructions are identical for each profile.

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 once. The screen displays “-P-“.

6. Scroll down one level by using the ZERO (down) key to reach the secondary top level. The instrument shows "P-PF 1".
7. Move from one profile [PF 1 to PF 5] to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from P-PF 1 to P-PF 2, press the DATA key. To go from P-PF 2 back to P-PF 1, press the PROFILE key.
8. Scroll down using the ZERO (down) key to reach the parameter level. The instrument shows "PF1-Cb0".
9. Move from one "PF1-" menu parameter to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from PF1-Cb0 to PF1-Cb1, press the DATA key. To go from PF1-Cb1 back to PF1-Cb0, press the PROFILE key.
10. Once you have arrived at the proper "PF1-" menu parameter, e.g., "PF1-Cb0", press the ZERO (down) key once to arrive at the selection level. The instrument displays the current parameter setting.
11. If there is a selection list, scroll through the available parameter settings using the PROFILE (left) or DATA (right) keys. Otherwise, use the arrow keys to adjust the displayed value to the new value.
12. Once the setting you want is displayed on the screen, press the PEAK/FREEZE (set) key to save this value and revert to the parameter level, e.g., "PF1-Cb0".

1.6 Leaving the Polynomial Setup ("P") Configuration Menu

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

1.7 Polynomial Setup ("P") Menu Descriptions

This section provides more detailed descriptions of the selections found in the Polynomial Menu Chart. The menus are identical for each profile (PF-1 to PF-5). Detailed instructions can be found in the next section [Instrument Calibration]. Factory-set defaults are shown in **bold** with a checkmark; (✓).

CODE/NAME	DESCRIPTION	SELECTION LIST
PF1-Cb0 Compression (B0)	Sets the B0 polynomial term for compression negative span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-Cb1 Compression (B1)	Sets the B1 polynomial term for compression negative span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-Cb2 Compression (B2)	Sets the B2 polynomial term for compression negative span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence



PF1-Cb3 Compression (B3)	Sets the B3 polynomial term for compression negative span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-tb0 Tension (B0)	Sets the B0 polynomial term for tension positive span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-tb1 Tension (B1)	Sets the B1 polynomial term for tension positive span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-tb2 Tension (B2)	Sets the B2 polynomial term for tension positive span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-tb3 Tension (B3)	Sets the B3 polynomial term for tension positive span. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence

1.8 Entering the General (“G”) Configuration Menu

Note: This configuration menu has five (5) secondary-top levels - PF 1 to PF 5 - corresponding to the give (5) profiles (PF-1 to PF-5). Instructions are identical for each profile.

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 twice. The screen displays “-G-”.
6. Scroll down one level by using the ZERO (down) key to reach the secondary top level. The instrument shows “G-PF 1”.
7. Move from one profile [PF 1 to PF 5] to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from P-PF 1 to P-PF 2, press the DATA key. To go from P-PF 2 back to P-PF 1, press the PROFILE key. **Note: Stay on this level to select G2 to G30 parameters.**
8. Scroll down using the ZERO (down) key to reach the parameter level. The instrument shows “PF1-G 3”.

9. Move from one "PF1-" menu parameter to the next by using the PROFILE (left) or DATA (right) keys. For example, to go from PF1-G 3 to PF1-G 8, press the DATA key. To go from PF1-G 8 back to PF1-G 3, press the PROFILE key.
10. Once you have arrived at the proper "PF1-" menu parameter, e.g., "PF1-G 3", press the ZERO (down) key once to arrive at the selection level. The instrument displays the current parameter setting.
13. 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.
14. 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., "PF1-G 3".

1.9 Leaving the General ("G") Configuration Menu

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

1.10 General ("G") Menu Descriptions

This section provides more detailed descriptions of the selections found in the Setup Menu Chart.

These menus apply to all profiles (PF-1 to PF-5). Detailed instructions can be found in the next section [Instrument Calibration]. Factory-set defaults are shown in **bold** with a checkmark; (✓).

CODE/NAME	DESCRIPTION	SELECTION LIST
PF1-G3 Calibration Equation Switchover Threshold	Selects the range within which the instrument will automatically switch between tension and compression modes. "0" = 0.00000 mV/V "1" = ±0.00001 mV/V "2" = ±0.00002 mV/V "5" = ±0.00005 mV/V "10" = ±0.00010 mV/V "20" = ±0.00020 mV/V "50" = ±0.00050 mV/V "100" = ±0.00100 mV/V "200" = ±0.00200 mV/V	100 ✓ 0, 1, 2, 5, 10, 20, 50, 100, 200
PF1-G8 Calibration Unit	Sets the force unit of measure to be used in the calibration process and the default unit for normal operation. "1" = pounds (lbf) "2" = kilograms (kgf) "3" = Newtons (N) "4" = kilopounds (kips) "5" = Tonnes (Tf) "6" = kilonewtons (kN)	1 ✓ 2 3 4 5 6
PF1-G9 Display Divisions	Sets the interval value. Use together with PF1-F10.	1 ✓ 1, 2, 5, 10, 20, 50
PF1-G16 Zero Calibration	Places instrument into live zero-calibration mode. Scrolling down with the ZERO key one level begins the procedure.	Press ZERO key to begin sequence
PF1-G60 Mode	Used to select the primary source of system calibration. "PoLYno" = Polynomials "LC-CAL" = Live Calibration	PoLYno ✓ LC-CAL

G2 Sampling Rate	Sets the sampling rate in Hertz (measurements per second). Note: H2 = Hertz (Hz)	10, 20, 30, 50, 60, 80, 120 10 H2 ✓
CODE/NAME	DESCRIPTION	SELECTION LIST
G6 Digital Filter	Averages force readings to produce higher stability. A lower number provides a faster response. Choose the speed that works best for your application. "AUto" = Automatic "Avg-xx" = Averaging Filter	Auto ✓ 01, 04, 08, 16, 24, 32, 40, 48, 56, 64
G11 No. of L/C wires	Selects the number of wires on the force sensor(s) to be connected to the instrument. Cabled systems only. "4" = four wires "6" = six wires (SENSE)	4 ✓ 6
G16 Ref. Calibration - Zero	Places instrument into reference zero calibration mode (mV/V). Scrolling down with the ZERO key one level begins the procedure. Password protected – FACTORY USE ONLY!	Press ZERO key to begin sequence
G17 Ref. Calibration - Span	Places instrument into reference span calibration mode (mV/V). Scrolling down with the ZERO key one level begins the procedure. Password protected – FACTORY USE ONLY!	Press ZERO key to begin sequence
G21 Factory Reset	This sub-menu will reset all setup parameters to the default settings. It will not overwrite any previously saved calibration data. Password protected – FACTORY USE ONLY!	Press the ZERO key twice to execute
G30 Special Application	Used to select a special application feature. "0" = None (Normal operation) "5" = Peak Operation	0 ✓ 5

1.11 Entering the User/COM1 ("A1") 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 displayed. The instrument displays "-F-".
5. Press the DATA (right) key three times. The screen displays "-A1-".
6. Scroll down using the ZERO (down) key to reach the parameter level. The force instrument shows "A1-1".

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; the indicator prompts for the first calibration point
3. key in number 111111 and press the PEAK key; the 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.

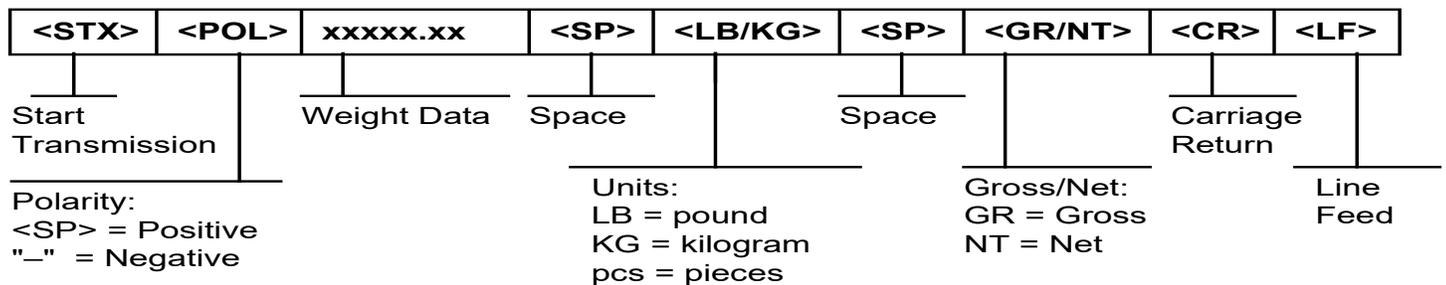
SERIAL PORT INFO

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