IPM650
Intelligent Panel-Mount Display

Sensor Solutions Source
Load · Torque · Pressure · Multi Component · Calibration · Instruments · Software

www.futek.com

Getting Help

TECHNICAL SUPPORT
For more IPM650 support, please visit: http://www.futek.com/ipm650/support.aspx

Table of Contents

Display Features

1. 16×4 Character LCD

2. Active Channel Number

3. Peak Value

4. Tracking Value

5. Valley Value

6. Sampling Rate
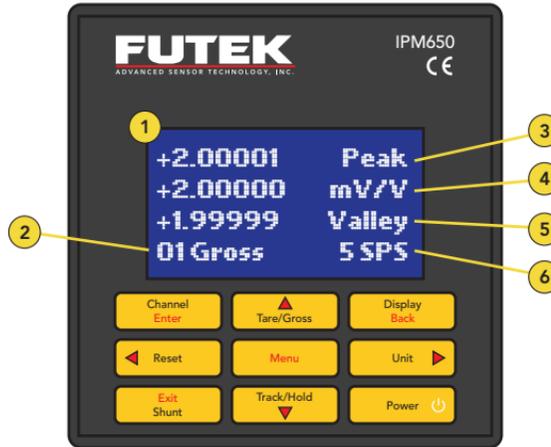
TIPS FOR DISPLAY AND KEY FUNCTIONS

The Units button can change between similar units.

Hold will flash on the LCD when active.

Shunt will be displayed on the LCD when active.

The Tare function can be used to zero out a sensor's no load state, or to account for a fixture.

Buttons

Channel / Enter
Displays Channel Information
IN MENU MODE: Enter

Unit ▶
Toggles between engineering units (force, torque, pressure, and displacement) and the standard mV/V.
IN MENU MODE: ▶ Arrow

▲ Tare/Gross
Toggles between displaying the tare and gross values. Used to remove any fixture weights.
IN MENU MODE: ▲ Arrow

Exit / Shunt
Performs a shunt action using internal resistor
IN MENU MODE: Exit

Display / Back
Changes display to show peak, tracking, valley, or all values
IN MENU MODE: Back

Track/Hold ▼
Freezes the current reading. HOLD will appear on the LCD when active. Pressing any key on the keypad will cancel the hold command.
IN MENU MODE: ▼ Arrow
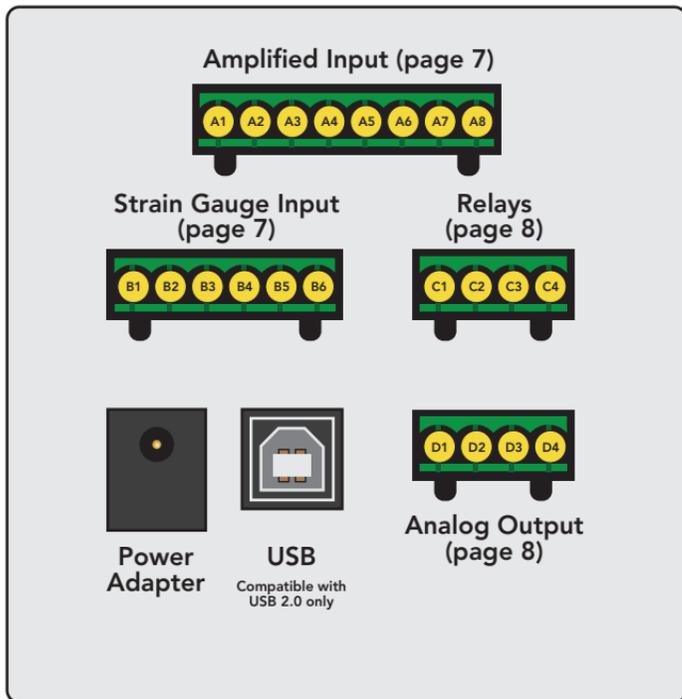
◀ Reset
Resets peak/valley
IN MENU MODE: ◀ Arrow

Power ⏻
ON/OFF
IN MENU MODE: ON/OFF

Menu
Start navigation
IN MENU MODE: n/a

Connector Pin Configuration

Amplified Input (page 7)

A1 A2 A3 A4 A5 A6 A7 A8

Strain Gauge Input (page 7)

B1 B2 B3 B4 B5 B6

Relays (page 8)

C1 C2 C3 C4

Power Adapter

USB
Compatible with USB 2.0 only

D1 D2 D3 D4

Analog Output (page 8)

CONNECTION TIPS

The +/– Excitation and +/– Signal connections are used with mV/V output sensors with the +/– Excitation used to supply power to the sensor.

The 24V output supply can be used to power amplified sensors, such as our amplified Rotary Torque sensors (for instance the TRS605).

View online wiring code here:
http://www.futek.com/wirecode.aspx

Wiring Layout

AMPLIFIED INPUT		
PIN	SYMBOL	DESCRIPTION
A1	G	Ground/Shield
A2	G	Ground/Shield
A3	24V OUT	24VDC Output
A4	5V OUT	5VDC Output
A5	–V	–V and –mA Amplified Input Connections
A6	+V	+V and +mA Amplified Input Connections
A7	PLEAD	n/a
A8	PLAG	n/a

STRAIN GAUGE INPUT		
PIN	SYMBOL	DESCRIPTION
B1	G	Ground/Shield
B2	TEDS	TEDS Data
B3	–S	–Signal
B4	+S	+Signal
B5	–E	–Excitation
B6	+E	+Excitation

Note: Shield should only be connected on either sensor side or instrument side. If connected on instrument side use following directions. Connect shield to pin A1 or pin A2 of Amplified Input if sensor is amplified. Connect shield to pin B1 of Strain Gauge Input if sensor is strain gauge.

Wiring Layout (continued)

RELAYS		
PIN	SYMBOL	DESCRIPTION
C1	–R2	Solid State Relay 2 (–)
C2	+R2	Solid State Relay 2 (+)
C3	–R1	Solid State Relay 1 (–)
C4	+R1	Solid State Relay 1 (+)

ANALOG OUTPUT		
PIN	SYMBOL	DESCRIPTION
D1	–VOUT	Voltage Output (–)
D2	+VOUT	Voltage Output (+)
D3	G	Ground (current)
D4	IOUT	Current Output

IPM650 Wiring Connection Examples: **http://www.futek.com/files/Pdf/Manuals_and_Technical_Documents/IPM650Wiring.pdf**

TIPS FOR WIRING

Ground (G) connections can be used to connect a cable shield.

Strain Gauge Input is for sensors with a mV/V output level.

Green screw terminals can be removed to allow easy access to connect the wires.

Profile Quick Setup (Calibration)

The IPM650 can store up to 15 profiles with channel 2 through 15 being user selectable.

1. Menu
2. Sensor Profile
3. New Channel
4. Set channel using left and right arrow keys followed by Enter
5. Sensor Config and choose sensor output type
6. Direction
7. Unit Selection
8. Sensor Capacity
9. Sensitivity (+)
10. Sensitivity (–) if applicable
11. Serial Number, (Serial number on sensor)
12. Back to go back one menu
13. Save Changes
14. Back to exit Main Menu and put the IPM650 into normal reading display

A full profile setup guide can be found on our FUTEK website at: **http://www.futek.com/files/Pdf/QuickStartGuide/IPM650ProfileSetup.pdf**

TIPS FOR SETTING UP A PROFILE

The decimal point can be moved by selecting it first and turning it into a number, and then selecting another digit to change it into a decimal point.

Sensitivity (+) must be entered. If only one direction is selected, then sensitivity (+) will be applied to both directions of output or negative direction output.

Sensitivity is the sensor's output level, such as mV/V output, and is found on the calibration certificate.

Pressing back without saving will prompt to exit without saving. Enter can be used for Yes, and Back for No.

Current profiles cannot be set up manually and must be set up using the Live Calibration feature in the profile setup.

Full bridge sensor type is for mV/V output sensors. Voltage output and current output are for amplified inputs to the IPM650.

Online sensor calibration data may be available by sensor serial number at **http://www.futek.com/CalibrationData.aspx** to assist in finding your sensor's output or sensitivity.

TEDS and Channel Select

TEDS MENU

1. Menu
2. TEDS Data
3. TEDS Device — Will show information about TEDS chip.
4. TEDS Pages — Shows programmed information stored in chip.
5. Load Data — Will load TEDS information into IPM650.
6. Auto Detection — Sets the IPM650 to automatically load TEDS information upon power on.

CHANNEL SELECT (CALIBRATION PROFILE SELECT)

1. Menu
2. System Setting
3. Channel Select
4. Use the left and right arrow key to choose the desired channel.
5. Enter to load Channel or Profile.

TIPS FOR USING TEDS AND CHANNEL SELECT

TEDS is a small chip that can store a sensor's calibration information. The IPM650 can read it upon power up, or by loading it through the menu, and setup a profile with the stored information.

TEDS calibration information can be viewed upon loading TEDS, either during a power on or while selecting Load Data under the TEDS menu.

The TEDS chip should be placed within 5ft. of the IPM650 sensor connection to maintain proper power. Typically the TEDS chip is placed in the sensor binder connector.

An auto-calibration may be performed when loading TEDS information, or a new channel or profile.

Profile Lockout and LCD Settings

LOCK SETTING MENU

1. Menu
2. Lock Setting

    a. Lockout Profile

    b. Unlock Profile

    c. Change Password

LCD SETTINGS

1. Menu
2. LCD Setting

    a. Contrast

    b. Brightness

    c. Auto LCD Off

TIPS FOR PROFILE LOCKOUT & LCD SETTINGS

To lockout the ability to create, edit, or delete a calibration profile in the IPM650, use the Lock Settings menu.

The default lockout password will be the serial number on the back of the IPM650. The password can be changed to a new numerical combination.

The LCD contrast and brightness can be set to maximum and the levels can be saved as default for all future usage of the IPM650.

Use the left and right arrow keys to increase or decrease the brightness and contrast of the LCD display in the LCD display setup menu.

A message stating, "Selected feature is not available at this time," will be displayed when profile control is locked out.

Profile will be locked out when a system calibration at FUTEK is performed.

Analog Output Quick Setup

VOLTAGE OUTPUT

Output Type Setup:

1. Menu
2. Output Config.
3. Voltage Config.
4. Select Bi-polar or Uni-polar

Turn on voltage output:

5. Back to exit to main menu
6. Interfaces
7. Voltage Output
8. Select Enable
9. Back to main menu
10. Back again to exit

CURRENT OUTPUT

Output Type Setup:

1. Menu
2. Output Config.
3. Current Value
4. Select current output range
5. Current Config.
6. Select Uni-direction or Bi-direction

Turn on current output:

7. Back to exit to main menu
8. Interfaces
9. Current Output
10. Select Enable
11. Back to exit to main menu

TIPS FOR ANALOG OUTPUT

Bi-polar and Uni-polar for voltage configurations will determine if the output would be ±5VDC for both directional outputs from the sensor, or map both directional outputs to +5VDC with the zero at 2.5VDC.

Analog Low is set to zero load readings and Analog High is set to the full capacity of the sensor profile.

Uni-direction or Bi-direction for current will determine if the current output range is for the positive output of the sensor, or if the zero should be shifted to allow the selected current output range to adjust for both directions from the sensor.

A Tare function will affect the reading on the IPM650 as well as the Analog Output.

Alarm and Relay Quick Setup

ALARM SETUP

Alarm Limit set points:

1. Menu
2. Sensor Profile
3. Edit Channel (Choose appropriate channel)
4. Limit & THD
5. Alarm Limit Hi and Alarm Limit Lo
   (Set the appropriate percentage of the full sensor's output for Hi and Lo limits)
6. Back to Edit Profile Menu
7. Back to Profile Menu
8. Save Changes
9. Back to Main Menu
10. Back to Display Screen

Alarm Configuration and Alarm Activity:

11. Menu
12. System Settings
13. Alarm Config (Latched or Non-Latched)
14. Alarm Activity (Enable or Disable)
15. Back to Main Menu
16. Back to Display Screen

RELAY SETUP

Output configuration:

1. Menu
2. Output Config.
3. Alarm Relay 1 and Alarm Relay 2
4. Choose Normally Open or Normally Closed
5. Back to Output Config. Menu
6. Back to Main Menu
7. Back to Display Screen

Activate Relays:

8. Menu
9. Interfaces
10. Relay 1 and Relay 2 Output (Enable or Disable)
11. Back to Main Menu
12. Back to Display Screen

TIPS FOR ALARMS AND RELAYS

Alarm Relay 1 is mapped to Alarm High and Alarm Relay 2 is mapped to Alarm Low.

Threshold limits are set as a percentage of the capacity of the sensor.

Pressing Reset on the IPM650 will reset any alarm status.

Peak will flash on the IPM650 for an active alarm high state, and Valley will flash for an active low alarm state.

Alarms function off GROSS readings.

Data Logging

Data logging is the ability to capture readings over a specified time period for later evaluation. The Data logging information can be uploaded into the FUTEK SENSIT software and further exported into other programs, such as Microsoft Excel.

DATA LOGGING QUICK SETUP

1. Menu
2. Data Logging
3. Logging Rate
4. Choose Full speed or Half Speed
5. Duration
6. Enter duration of data logging test in seconds
7. Action
8. Choose to Start or Stop data logging session

TIPS FOR USING DATA LOGGING

The IPM650 can store up to 21,000 data logging points. Each point is a captured reading.

The sampling rate used will be the current sample per second setting in the IPM650 when Full Speed is selected and half the current set sampling rate when Half Speed is selected.

The maximum data logging duration will be the 21,000 data logging points divided by the sampling rate used.

The data logging information is lost when power is turned off on the IPM650.

At slower sampling it is possible to exit the data logging menu to view a count-down timer.

A check mark will be present next to Action to show a data logging session is active.

When the data logging session is complete the IPM650 will display a successful message and return to the display screen.

Pressing stop before the end of a session will result in the captured readings overwriting the prior readings up till the run time.

SENSIT™ Test and Measurement Software

The IPM650 can be used with the FUTEK SENSIT software, which can be purchased separately or evaluated through a free trial version available on the FUTEK website.

FUNCTIONS AVAILABLE IN SENSIT WITH THE IPM650:

- Ability to see current reading in Display table

- Ability to upload, list, plot, and export data logging information from the IPM650

- Ability to view, list, and export a live graphing session

- Ability to remotely control the IPM650 through a virtual front panel

TO SETUP DATA LOGGING IN SENSIT FOR IPM650:

1. Data Logging Mode Tab
2. Settings
3. File Path
4. Start Test

In SENSIT the items that do not apply to the IPM650 will be grayed out in the Data logging Settings.

Start Test will import the data logging information into SENSIT.

TIPS FOR USING SENSIT WITH THE IPM650

The IPM650 should be turned on and connected to the computer prior to starting SENSIT.

USB output, under Interfaces in the IPM650, should be enabled with a check mark to confirm its operation.

Performance Review

INPUT			
PARAMETER	**MIN**	**MAX**	**UNIT**
Input Range 1	−500	500	mV/V nom.
Input Range 2	−12	12	VDC
Input Range 3	0	30	mA

POWER ADAPTER		
PARAMETER	**MIN**	**MAX**
Input	90–264 VAC	0.5 A 50/60 Hz
Output	15 VDC	1.2A

OUTPUT			
PARAMETER	**MIN**	**MAX**	**UNIT**
Analog Voltage	0	5	VDC
	−5	5	VDC
Analog Current	0	20	mA
	4	20	mA
	0	25	mA
	5	25	mA

Specifications

POWER REQUIREMENT

- Power Supply Adapter: 15 VDC/1.2 A

SOLID STATE RELAYS

- Part Number: G3VM-2F
- Application: Alarm Relay 1, 2
- Maximum Output Voltage: 250V (AC or DC)
- Maximum Output Current: 120 mA

Note: Internally limited and protected to 110V/100 mA

RESPONSE TIMES

- Conversion capture rate: every sample
- Peak capture rate: every sample
- Valley capture rate: every sample
- Conversion display update rate: 5 times per second
- Peak display update rate: 5 times per second
- Valley display update rate: 5 times per second

PASSWORDS

- Default Password: 0000000
- Alternative Password: Device's Serial Number

PHYSICAL PROPERTIES

- Instrument Weight: 1.9 lbs. (862g) without mounting bracket
- Dimensions: 3.8"(W) × 3.8"(L) × 6.5"(D)

BANDWIDTH

The digital output bandwidth has been specified as SPS/4.

The analog output bandwidth has been specified as SPS/4 for sampling rates less than 1200 SPS and has been specified as SPS/5 for sampling rates more than 1200 SPS if:

1. ASCII stream output is deactivated
2. IPM650 is not connected to computer
3. All relays are disabled
4. Display is in menu mode (Peak, Valley, Tracking, and data display are main display mode)

Sampling Rate and Selecting number of Digits

SETTING SAMPLING RATE

1. Menu
2. System Settings
3. Sampling Rate

CHANGING NUMBER OF DIGITS:

1. Menu
2. System Settings
3. Digits Select

TIPS

The sampling rate can be set from 5 sps to 4800 sps at preset intervals.

Increasing the sampling rate may increase the noise as the IPM650 becomes more sensitive to input changes.

The decimal point is floating on the IPM650 which means with 4 decimal points the format will automatically adjust from 0000 to 0.000. For example, a 1,000lb load cell would display from 1000 to 0.001lbs.

The number of digits can be selected from 3 to 6 and can be saved as default.

Troubleshooting Tips

- An "Overflow" message usually indicates an output higher than that specified in the profile type and can be from the load cell or from an open to the IPM650 from the sensor. The load cell connections should be confirmed and the load cell for any overload damage.

- If the sensor profile is locked out a message, "Selected feature is no available at this time," will appear. See the lock setting section of this manual for more information.

- A live calibration can be performed using the calibration option in the IPM650 profie setup and will require known loads. The load to use should match the capacity listed in the profile.

- If the readings are not correct for the applied load, review the sensor profile and confirm the capacity and sensitivity for your load cell.

- Profile 1 is a system mV/V reference channel and can be used to confirm the output of a sensor and help in troubleshooting any questions in a profile setup.

- In the main menu Diagnostic can be used with the external setting to confirm the resistance on the output connections of the load cell.

- In the IPM650 Elite the Display button can be pressed to show encoder information. This screen must be active for SENSIT Live Graphing to capture encoder information.

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