

# IHH500

## Intelligent Handheld Display

Sensor Solutions Source

Load · Torque · Pressure · Multi Component · Calibration · Instruments · Software

[www.futek.com](http://www.futek.com)

# Getting Help

## TECHNICAL SUPPORT

For more IHH500 support, please visit: <https://www.futek.com/support>



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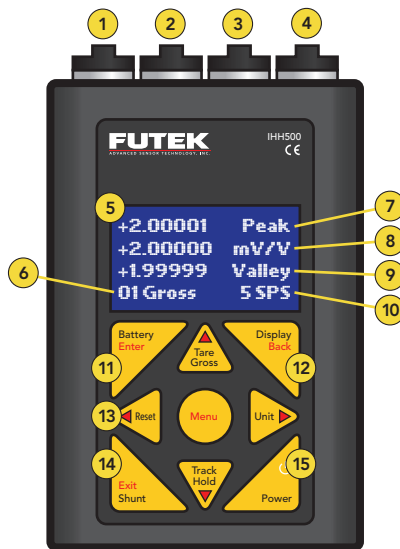
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# Display Features

- 1 Power Connector
- 2 USB Connector  
(Compatible with USB 2.0 Only)
- 3 Output Connector
- 4 Sensor Connector
- 5 16×4 Character LCD
- 6 Active Channel Number
- 7 Peak Value
- 8 Tracking
- 9 Valley Value
- 10 Sampling Rate
- 11 Battery Indicator
- 12 Larger Font Display Options
- 13 Peak/Valley Reset
- 14 Shunt Calibration Verification
- 15 Power Key



# Buttons



Displays Battery Life  
**IN MENU MODE:** Enter



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



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



Alters the current reading by shunting a resistor across the – Excitation and – Signal connections.  
**IN MENU MODE:** Exit



Toggles between two font sizes. Selects one of four states in normal mode, and one of five states (RPM, torque, angle, power) when a rotary sensor with encoder is monitored.  
**IN MENU MODE:** Back



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



Resets peak/valley or angle (in rotary sensors with an encoder)  
**IN MENU MODE:** ▲ Arrow

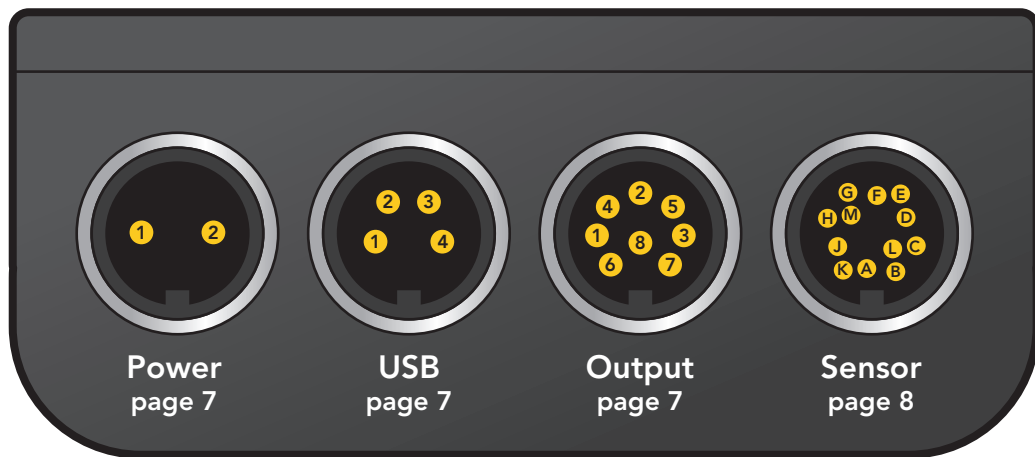


ON/OFF  
**IN MENU MODE:** ON/OFF



Start navigation  
**IN MENU MODE:** n/a

## Connector Pin Configuration



# Wiring Layout

## POWER CONNECTIONS

PIN	SYMBOL
1	12V
2	Ground

Note: These pins are not polarity sensitive.

## USB PORT CONNECTIONS (COMPATIBLE WITH USB 2.0 ONLY)

PIN	SYMBOL
1	VBUS
2	-D
3	+D
4	GND

## OUTPUT CONNECTIONS

PIN	SYMBOL	DESCRIPTION
1	IDAC	analog current output signal
2	REFERENCE	analog voltage output return
3	+R1	solid state relay 1 (positive)
4	VDAC	analog voltage output signal
5	+R2	solid state relay 2 (positive)
6	GND	analog current output return
7	-R1	solid state relay 1 (negative)
8	-R2	solid state relay 2 (negative)



[IHH500 Wiring Connection Examples](#)

## Wiring Layout (continued)

### SENSOR CONNECTIONS

PIN	SYMBOL	DESCRIPTION
A	+E	+Excitation
B	+S	+Signal
C	-E	-Excitation, TEDS return
D	-S	-Signal
E	TEDS_IO	TEDS Data
F	24_OUT	24V output

**Note:** Cable shield should be connected to pin G, ground, and should be grounded on one end, either the sensor side or the IHH500 connection side.

**WARNING:** Connections to amplified sensors, such as FUTEK's amplified rotary torque sensors, must be made with the IHH500 powered off first to avoid potential damage to amplified sensors.

PIN	SYMBOL	DESCRIPTION
G	GND_OUT	Ground/Shield
H	5_OUT	5V Output
J	-V	-V and -mA Amplified Input Connections
K	+V	+V and +mA Amplified Input Connections
L	PLEAD	Leading pulse from sensor
M	PLAG	Lagging pulse from sensor

### 12-PIN SENSOR TO IHH500 BINDER ASSEMBLY





## 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 example TRS605.

The 5V output is typically used to power items such as the encoder in our rotary torque sensors.

The IHH500 Elite is capable of interacting with encoders, such as those in our Rotary Torque sensor, with the encoder outputs on the Leading and Lagging pulse connections.

Typically our rotary torque sensor encoders will have Angle 1 on the Leading Pulse connection and Angle 2 on the Lagging pulse connections.

If the Leading Pulse Pin L leads Pin M the Encoder count will increase and if the Lagging Pin M leads Pin L the encoder count will decrease.

## Profile Quick Setup (Calibration)

The IHH500 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 IHH500 into normal reading display



[Full profile setup guide](#)

## 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.

Online sensor calibration data may be available by sensor serial number at <https://www.futek.com/support> to assist in finding your sensor's output or sensitivity.

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

IHH500 Elite supports Encoders through Pulse profiles.

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 IHH500.

# 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 IHH500.
6. Auto Detection — Sets the IHH500 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.

**Note:** Alarm set point are not accessible while using TEDS. To use Alarms, create a profile using your sensor's calibration certificate.

## TIPS FOR USING TEDS AND CHANNEL SELECT

TEDS is a small chip that can store a sensor's calibration information. The IHH500 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 IHH500 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 IHH500, use the Lock Settings menu.

The default lockout password will be the serial number on the back of the IHH500. 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 IHH500.

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.

If the keypad is non-responsive then it has been locked out. To restore functionality, connect the instrument to a PC running SENSIT. On the display mode tab, right click on the instrument and uncheck "Keypad Locked."

# 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  $\pm 5\text{VDC}$  for both directional outputs from the sensor, or map both directional outputs to  $+5\text{VDC}$  with the zero at  $2.5\text{VDC}$ .

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 IHH500 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

## TIPS FOR ALARMS AND RELAYS

**Alarms function off GROSS readings.**

# Alarm and Relay Quick Setup (continued)

## 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 IHH500 will reset any alarm status.

Peak will flash on the IHH500 for an active alarm high state, and Valley will flash for an active low alarm state.



# 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 IHH500 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 IHH500 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 IHH500.

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 IHH500 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 IHH500 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 IHH500:

- Ability to see current reading in Display table
- Ability to upload, list, plot, and export data logging information from the IHH500
- Ability to view, list, and export a live graphing session
- Ability to remotely control the IHH500 through a virtual front panel

## TO SETUP DATA LOGGING IN SENSIT FOR IHH500:

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

In SENSIT the items that do not apply to the IHH500 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 IHH500

The IHH500 should be turned on and connected to the computer prior to starting SENSIT.

USB output, under Interfaces in the IHH500, 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

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

POWER ADAPTER		
PARAMETER	MIN	MAX
Input	90–264 VAC	0.5 A 50/60 Hz
Output	12 VDC	1A

# Specifications

## POWER REQUIREMENT

- Power Supply Adapter: 12 VDC/1 A
- Internal battery: Rechargeable, lithium polymer battery
- Battery size: 7.4V/3000 mAh
- Run Time: up to 30 hours with 350 $\Omega$  Bridge
- Battery Charger: Wall plug AC powered-unit

## SOLID STATE RELAYS

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

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

## PASSWORDS

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

## 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

## 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. IHH500 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 IHH500 becomes more sensitive to input changes.

The decimal point is floating on the IHH500 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 IHH500 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 not 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 IHH500 profile 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.
- For the IHH500 Elite, the Display button can be pressed to show encoder information. This screen must be active for SENSIT Live Graphing to capture encoder information.
- Visit [www.futek.com/support](http://www.futek.com/support) for additional support from our technical support team.

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