

# USB520/USB530

## External USB Output Kit

### Sensor Solutions Source

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

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

# Getting Help

## TECHNICAL SUPPORT

For more USB support documentation please visit: <http://www.futek.com/usb/support.aspx>



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### EM1017

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## Layout and Included Accessories

Included with the USB520 and USB530 is one 12 pin male plug for use with a sensor, and one 4 pin USB cable assembly for connections to a computer USB 2.0 port.



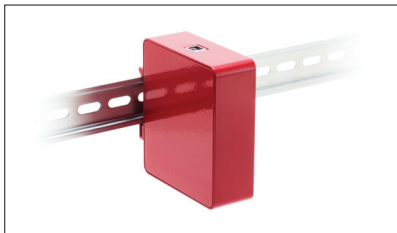
**12 PIN SENSOR CONNECTOR**



**12 PIN SENSOR BINDER PLUG**



**USB 2.0 HI-SPEED A/B CABLE WITH  
FERRITE CHOKES (M/M) 6 FT**



**DIN RAIL MOUNTED**

## SENSOR CONNECTIONS

PIN	SYMBOL	DESCRIPTION
A	+E	+Excitation
B	+S	+Signal
C	−E	−Excitation
D	−S	−Signal
F	24_OUT	24V output
G	GND_OUT	Ground

PIN	SYMBOL	DESCRIPTION
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 CONNECTOR TO USB520 AND USB530



## Binder Connector From Sensor

The  $\pm$  Excitation and  $\pm$  Signal pins are used for mV/V non-amplified output sensors.

For six wire sensors with  $\pm$  Sense, the  $\pm$  Sense connections should be connected to the  $\pm$  Excitation connections respectively.

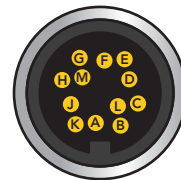
For amplified output sensors, the selectable 24V Output and Ground pins can be used to power the sensor, and the  $\pm$  Amplified pins can be used for Voltage or Current outputs from the sensor.

The 5V Output and Ground pins can be used to power circuits, such as encoders in our rotary torque sensors.

The Leading Pulse and Lagging Pulse pins can be used with the Ground pin for encoder outputs.

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

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

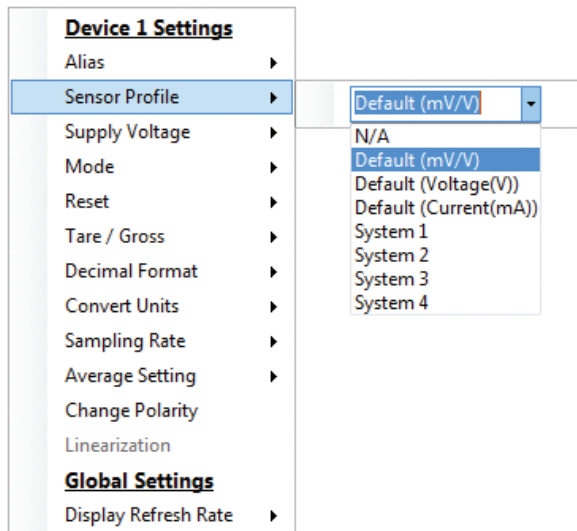


The USB520 Spec Sheet can be found here:  
<http://www.futek.com/files/pdf/Product%20Drawings/USB520.pdf>



And the USB530 Spec sheet can be found here:  
<http://www.futek.com/files/pdf/Product%20Drawings/USB530.pdf>

# Multiple Profile Selection in SENSIT Software



In SENSIT, profile options can be accessed by right clicking in the Display Mode screen.

The USB520 and USB530 offer four customizable calibration profiles and three default profiles. The default profiles include, mV/V, Voltage, and Current.

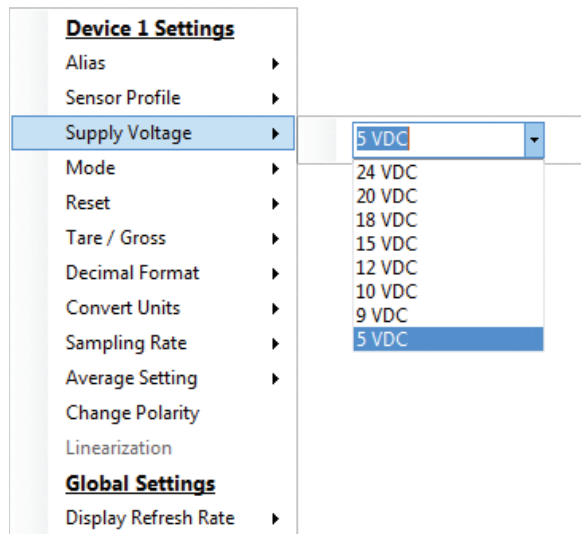
Profiles listed as System 1 through 4 can be user defined in the SENSIT calibration and can be used for different types of sensors or the same sensor.

One way to utilize the multiple profiles is to improve the accuracy for the lower range of a sensor by having one profile for the full sensor range and another one for the lower range of the sensor. This would allow a full capacity profile and a lower range capacity profile for the same sensor to be used as needed.



Please refer to the SENSIT Quick Start Guide, or our online SENSIT support documentation, for more information on using SENSIT at:  
<http://www.futek.com/sensit/support.aspx>

# Supply Voltage Selection in SENSIT Software



The USB520 and USB530 offer a selectable 5 VDC to 24VDC, 1 Watt power supply on its amplified 24V Out and Ground pins to power amplified sensors, such as the FUTEK rotary torque line, TRS605.

In SENSIT supply voltage options can be accessed by right clicking on the Display Mode screen.

When changing to a default profile the supply voltage will reset to 5 VDC to avoid possible damage to the sensor. The set voltage specified in the calibration will be used for programmable system profiles.



# Calibration Settings in SENSIT Software

Calibration Settings (Device 1)

1. Technician Name  
254 - User Defined

2. Calibration Channel  
☒ Channel 1  
☐ Channel 2  
☐ Channel 3

3. Crosstalk  
☒ Crosstalk Disabled  
☐ Crosstalk Enabled

4. Type of Calibration  
☒ mV/V Calibration  
☐ System Calibration

5. Active Channels  
☒ Channel 1  
☐ Channel 2  
☐ Channel 3

6. Sensor Output Type  
Bridge & Pulse

7. Gain Setting  
Gain = 128 (0.0 - 3.5 mV/V)

8. Supply Voltage  
5 VDC

9. Pulses Per Rotation  
360 Pulses

10. Serial Number  
534266 Serial Number

11. Output Units  
mV/V Output Units

12. Loading Points  
1 Loading Points

13. Decimal Points  
3 Decimal Points

14. Channel Name  
None Channel Name

15. Multiple Directions  
☒ Multiple Directions

16. Positive Direction (+)  
☒ Calibrate Direction 1  
2.000 Capacity 1  
Compressor Direction 1

17. Negative Direction (-)  
☒ Calibrate Direction 2  
0.000 Capacity 2  
Tension Direction 2

18. Backup Page  
☐ EEPROM Page 0 (N/A)  
☐ EEPROM Page 1 (mV/V)  
☐ EEPROM Page 2 (Voltage(V))  
☐ EEPROM Page 3 (Current(mA))  
☒ EEPROM Page 4 (System 1)  
☐ EEPROM Page 5 (System 2)  
☐ EEPROM Page 6 (System 3)  
☐ EEPROM Page 7 (System 4)  
☐ EEPROM Page 8 (N/A)  
☐ EEPROM Page 9 (N/A)  
☐ EEPROM Page 10 (N/A)  
☐ EEPROM Page 11 (N/A)  
☐ EEPROM Page 12 (N/A)  
☐ EEPROM Page 13 (N/A)  
☐ EEPROM Page 14 (N/A)  
☐ EEPROM Page 15 (N/A)

19. Ethernet Configuration  
Destination MAC Address  
Destination IP Address  
Destination Port Number  
Source MAC Address  
Source IP Address  
Source Port Number

OK Cancel Apply

Four EEPROM pages are available for custom sensor profiles, or calibrations, in the SENSIT calibration menu under the Calibration Settings.

The sensor output type does not have to be the same for each profile, meaning the USB520 and USB530 can be calibrated to multiple sensors with different output types, such as amplified and mV/V.

SENSIT utilizes a live calibration with known loads for the USB520 and USB530.

# ASCII Streaming Output

```
*****
+0.00000      rpm
+4.14023      N-m
+0.00000      deg
+0.00000      KW
*****
+0.00000      rpm
+4.82775      N-m
+0.00000      deg
+0.00000      KW
*****
+0.00000      rpm
+4.82775      N-m
+0.00000      deg
+0.00000      KW
*****
+0.00000      rpm
+5.56672      N-m
+0.00000      deg
+0.00000      KW
*****
```

This is an example of the streaming ASCII output for the USB520 and USB530.

The USB520 and USB530 can output an automatic streaming ASCII output of the current reading.

The ASCII output will turn off when the USB520 or USB530 is in command mode, such as when in use with SENSIT. Resetting, or unplugging and re-plugging in the USB instrument, will restart the ASCII streaming output.

The ASCII output is updated up to 10 samples per second.

# Specifications

## FEATURES

- USB 2.0 Communication Link
- USB Bus - Powered (5V)
- Input/Output Short Circuit Protection
- Streaming ASCII Output

## ENVIRONMENT

- Operating Temperature: -13°F to 185°F [-25°C to 85°C]
- Storage Temperature: -40°F to 257°F [-40°C to 125°C]

## ENCODER INPUT\*

- Encoder Input: Quadrature Leading and Lagging Pulse
- Speed Measurement: Up to 150k pulses per second<sup>1</sup>
- Angle Measurement ( $\alpha$ ): up to 10k pulses per rotation (PPR)<sup>1</sup>

<sup>1</sup> Speed =  $\Delta\alpha \times 60 / \text{PPR}$

\* Encoder information is updated at 10hz.

## GENERAL

- Sampling Rate: Up to 4800 SPS for USB520 and 15,000 SPS for USB530
- Internal Resolution: 24 bits
- Nonlinearity: Better than  $\pm 0.01\%$  of FSR
- Accuracy: Better than  $\pm 0.01\%$  of FSR
- Output: Digital Packetized Data
- Integrated Digital Filter: 50 Hz/60 Hz rejection (100 dB)
- On Chip Memory: 1 Kilobyte
- Up to 16 Point Stored Calibration
- Weight: 0.9 lb (408 g)
- Selectable Supply Voltage 5-24 VDC / 1W

# Specifications (continued)

## STRAIN GAUGE mV/V INPUT

- Bridge Excitation: 4.6 VDC
- Standard Input Range:  $\pm 4$  mV/V (factory default)
- Optional Input Range:  $\pm 400$  mV/V
- Min. Bridge Resistance: 50 Ohm
- Max. Bridge Resistance: 5000 Ohm

## VOLTAGE INPUT

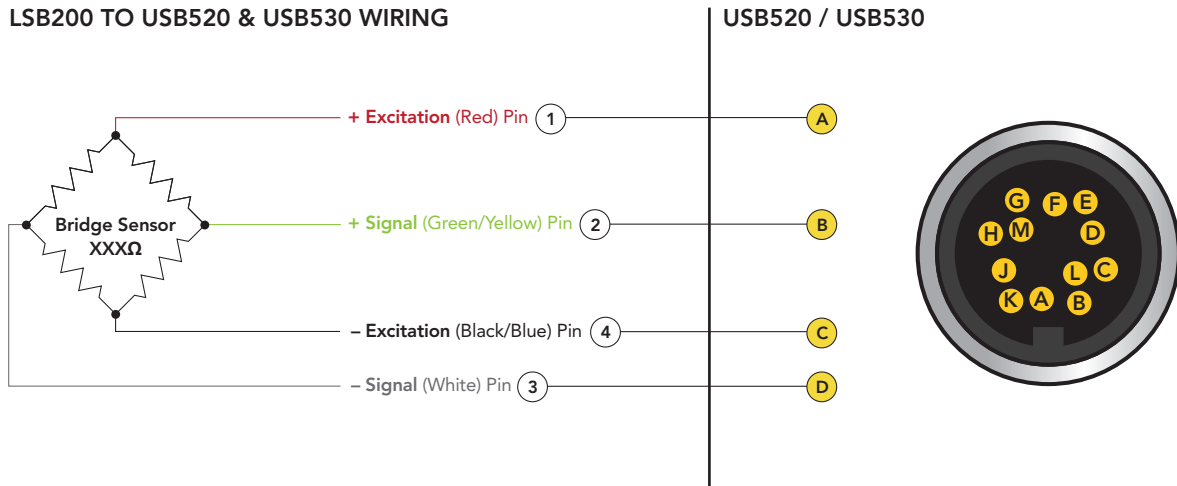
- Standard Input Range:  $\pm 10$  VDC (factory default)

## CURRENT INPUT

- Standard Input Range: 0–20 mA (factory default)

# mV/V Wiring Example

## LSB200 TO USB520 & USB530 WIRING



**Note:** For sensors with  $\pm$  Sense, the sense wires must be connected to  $\pm$  Excitation or clipped off.

# Amplified Output Wiring Example

## TRS605 TO USB520 & USB530 WIRING

### TORQUE CONNECTIONS

- Power Pin (F)
- Power Ground Pin (E)
- Signal Output Pin (C)
- Output Ground Pin (D)

### ENCODER CONNECTIONS

- Power Pin (H)
- Power Ground Pin (E)
- Signal Angle 1 Pin (B)
- Signal Angle 2 Pin (G)

### USB520 / USB530

F

G

K

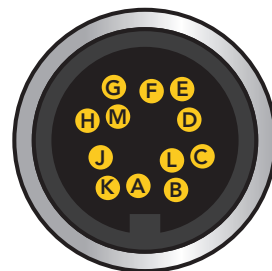
J

H

G

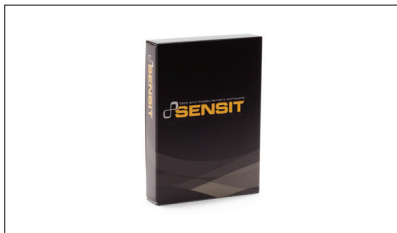
L

M



**Note:** Encoder and Torque share the same power ground connection E to G. Encoder connections supported by the USB520/USB530.

## Accessories



**SENSIT™ TEST AND MEASUREMENT  
SOFTWARE**

**Item Number:** FSH03189



**USB 2.0 HI-SPEED A/B CABLE WITH  
FERRITE CHOKES (M/M) 6 FT**

**Item Number:** GOD04123



**BINDER MALE PLUG WITH  
CABLE CLAMP**

**Item Number:** GOD02975



### **Programming Support**

FUTEK offers our USB DLL file as well as LabVIEW and Visual Basic examples online on the SENSIT support page at: <http://www.futek.com/sensit/support.aspx>



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